ING FORECAST

AN INDUSTRIAL PUBLISHING CORPORATION MAGAZINE

SEPTEMBER, 1958

Precision Metal Molding

PMM

INCLUDING DIE CASTINGS MAGAZINE

UNIVERSITY MICROFILMS
313 N FIRST ST
ANN ARBOR MICH
PIZ

DISTILLED PUBLISHING

DIE CASTINGS

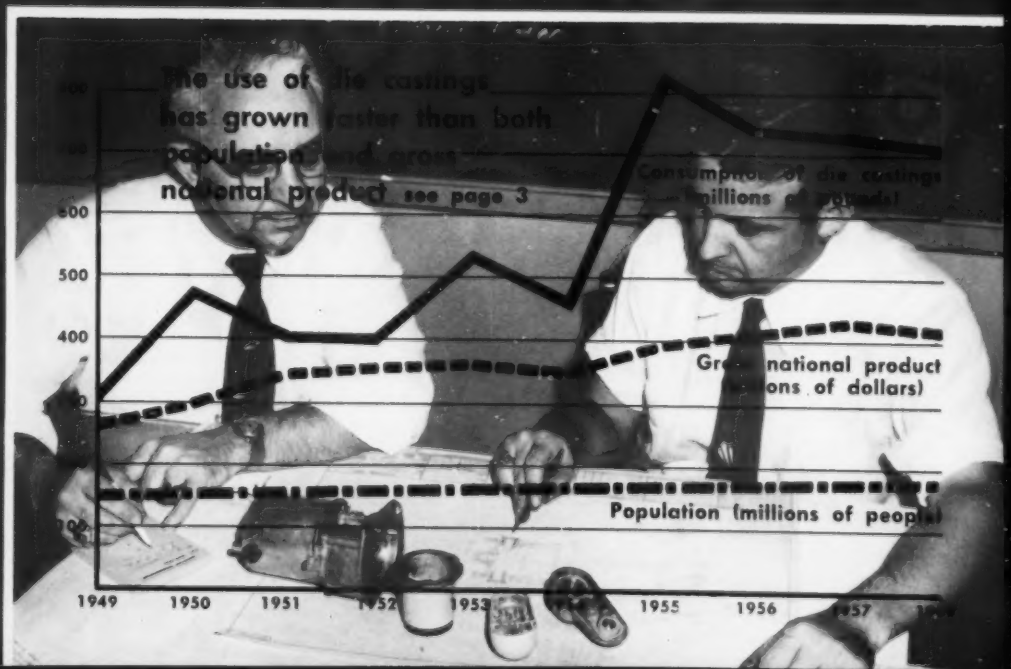
INVESTMENT CASTINGS

PERMANENT MOLD CASTINGS

PLASTER MOLD CASTINGS

POWDER METALLURGY

SHELL MOLD CASTINGS



Aluminum and Zamak

In All Standard Or Special Aluminum And Zinc Based Die Casting Alloys

ALUMINUM

ALLOYS

You're always sure of fast trouble-free production, less scrap and lower costs when you buy from your best source of supply.

- All ingot is quality controlled during production to insure uniform quality metal that is free from impurities and gas

ZAMAK

ZINC BASE DIE CASTING ALLOYS

- Composition is constantly checked to assure ingot meets your specifications
- All shipments are palletized and shipped with a certificate of analysis
- Deliveries are promptly made to meet your production schedule

ALUMINUM SMELTING & REFINING Co., Inc.

CERTIFIED ALLOYS CO.

DETROIT, MICHIGAN
P. O. BOX 4014
PHONE: VErmont 7-9962

INDIANAPOLIS, INDIANA
2727 NORTH MERIDIAN
PHONE: WAlnut 5-9289

LOS ANGELES PLANT
9323 BERMUDEZ ST., Rivera, Calif.
PHONE: OXford 9-9610

For more information circle No. 6 on the Reader Service Card

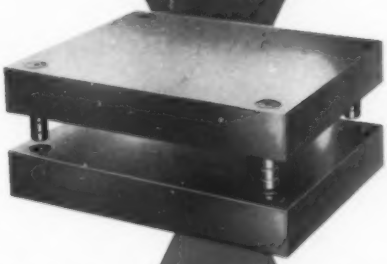
D-M-E STANDARD
Water-Cooled
SPRUE BUSHINGS

DIE CASTERS!

SAVE MONEY ON YOUR DIE CASTING DIES

D-M-E Standards can save you time and money on every die with less initial cost and longer die life.

D-M-E STANDARD
Water-Cooled
SPRUE SPREADERS



D-M-E STANDARD CAVITY RETAINER SETS
Available in Carbon or Alloy Steel

D-M-E STANDARD
Hotform and Nitralloy
EJECTOR PINS

Wide Range of Standard Sizes

from 9⅞" x 8" to 23¾" x 35½".

Standard plate thickness from ⅞" to 5⅞".

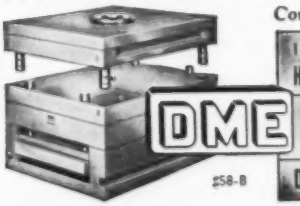
Ground flat and square — ready for cavity inserts.

SEVEN BRANCHES TO SERVE YOU. Write TODAY for Complete Prices and Specifications

DETROIT MOLD ENGINEERING CO.

6686 E. McNICHOLS ROAD — DETROIT 12, MICHIGAN — TWinbrook 1-1300

Contact Your Nearest Branch FOR FASTER DELIVERIES!



1217 CENTRAL AVE. HILLSIDE, N. J.	5901 W. DIVISION ST. CHICAGO, ILL.	3700 S. MAIN ST. LOS ANGELES, CAL.
D-M-E CORP.	502 BROOKPARK RD. CLEVELAND, O.	550 LEO STREET DAYTON, O.
D-M-E OF CANADA	156 NORSEMAN AVE.	TORONTO, ONT.

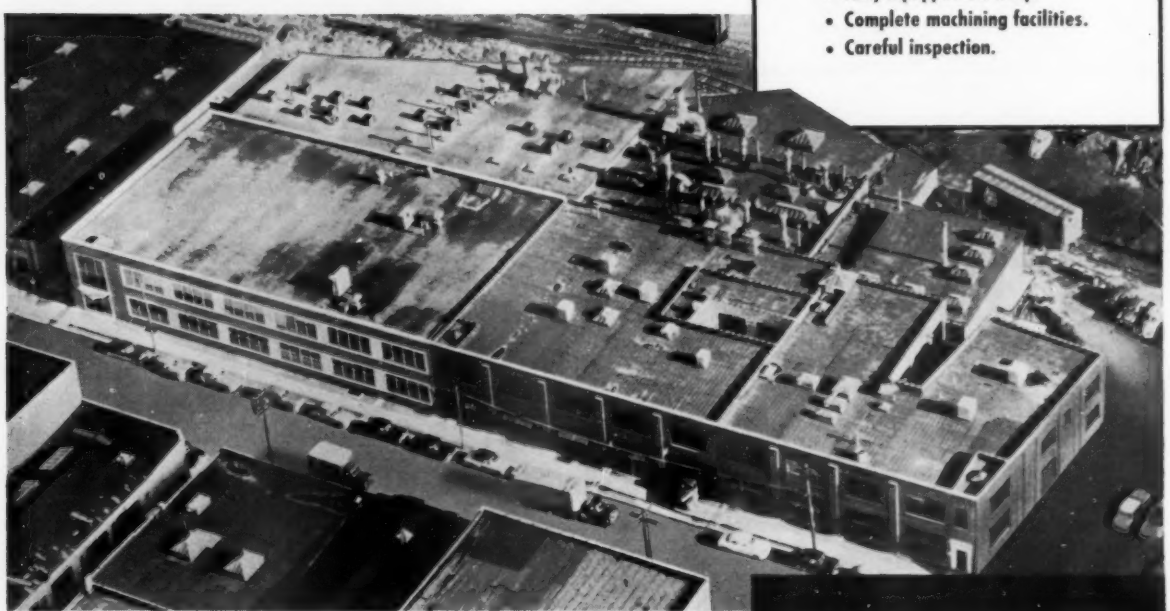
For more information circle No. 29 on the Reader Service Card

"Service – Quality – Price" take on New meaning

when backed by these extensive, modern

DOLLIN
DIE-CASTING FACILITIES

- Big, modern plant.
- High-production equipment—36 die-casting machines, many fully automatic.
- Trained personnel — 300 employees.
- Experienced engineers for consultation.
- Fully equipped die shop.
- Complete machining facilities.
- Careful inspection.



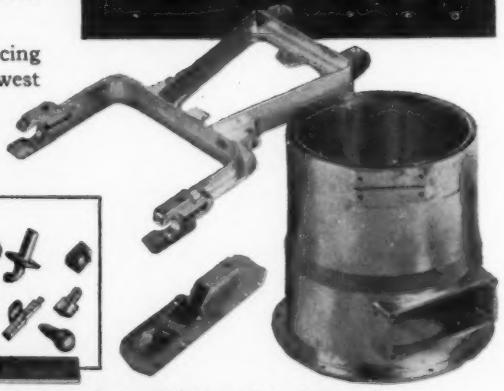
DOLLIN
Zinc and Aluminum
DIE-CASTINGS

Dollin Service means more than meeting delivery schedules—it begins with the die-casting print or problem. Can the design be improved, simplified—made more practical—lighter—stronger—lower in cost? Can machining, finishing and assembly costs be reduced?

Dollin Quality means die-castings that have sound structure, clean surfaces, accurate dimensions, fidelity of design.

Dollin Price means concentrating our entire facilities on producing the best possible die-casting for your application, at the lowest possible cost.

Submit prints or samples of parts for engineering advice and quotation, without obligation.



Complete range of sizes from "Midget" to Large Parts

Large aluminum and zinc castings made on latest-design, high production machines. Small aluminum and zinc castings made in sizes down to fractions of an ounce.

WRITE for 16-page Facilities Brochure. Illustrates and describes complete Dollin services, facilities and equipment.

DOLLIN CORPORATION

614 So. 21st St., Irvington 11, N. J.

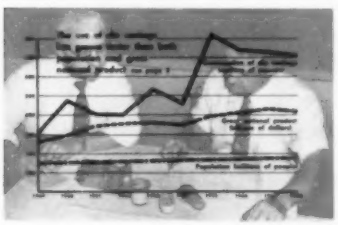
Sales Offices: Boston • Buffalo • Canton • Charlotte Chicago • Detroit • Indianapolis • Louisville • Memphis Philadelphia • Pittsburgh • St. Louis • St. Paul

See "Yellow Pages" for nearest office.

For more information circle No. 33 on the Reader Service Card

PMM **IN THIS ISSUE** September 1958: Volume 16 Number 9

COVER



THE GROWTH OF THE DIE CASTING INDUSTRY can best be gauged by comparing it with the rate of population growth and the rate of increase of gross national product. Any industry that is to remain healthy must grow at least as fast as the population of the country and if it lags appreciably behind the growth in value of gross national product, that industry is headed for difficulties. As our cover shows, the die casting industry, in spite of occasional dips has shown a consistent growth for the past ten years and this growth has been greater than either of the yardsticks with which it is compared. There is, therefore, little for the die caster to fear in the coming years. Unless a complete reversal of trend occurs, and this seems completely impossible, the years ahead should be prosperous ones for the industry. Now turn to page 41 and read the details of the Die Casting Forecast.

FEATURE ARTICLES

41 **IN 1959 DIE CASTING SHOPS WILL BE BUSY**
Has the recession ended? Read how shops making tools are humming. You can bet firms planning to use these tools will be busy too.

42 **THE USE OF DIE CASTINGS WILL GROW**
Are the product-manufacturers caught in a squeeze between machining-costs and profit-margins? If so, will they use more die castings?

43 **SURVEY OF DIE CASTING USES, OUTLINED INDUSTRY BY INDUSTRY**
Where is the growing market for tomorrow's die castings? It can be found by studying the surprising results of this national survey.

47 **DIE CASTERS WILL USE MORE METAL THAN EVER**
As the demand for die castings grows, need for metal grows right along with it. Here are details on metal-use expansion.

48 **TECHNICAL ADVANCES, WE'VE COME A LONG WAY**
Here are the facts of die-casting's future, what are the new developments, where is the industry going?

51 **MACHINES WILL SELL FASTER IN 1959**
What kind of die casting machines will sell faster next year? The data presented in this article tells, precisely!

52 **1959 CARS WILL USE MORE DIE CASTINGS, MORE ALUMINUM, MORE ZINC**
Thinking about the future automotive market for die castings? It's growing! Read these forecasts and check their figures.

55 **SAND CASTINGS ARE EXPENSIVE**
What happens when a sand casting is redesigned for manufacture by a PMM process? It's costs go down for one thing. Read why!

56 **CASTING DIE CAVITIES . . . PART III**
What are the future prospects of this method of casting die cavities? The last instalment of a three-part article describes them.

57 **REDESIGN CAN LOWER YOUR PART-MAKING COSTS**
Shell mold castings solve a problem in parts-design. This case-history tells how it was done and how the new part works.

63 **DESIGN TIPS**
Gives you some very good ideas on how to save metal by using care in design. Find out how to cut weight too!

92 **YOUR COMPLEX CORING PROBLEMS CAN BE SOLVED**
This is another informative article telling how engineers solved a ticklish coring problem with investment castings.

FINISHING SECTION

67 **CHOOSING A FINISH FOR ZINC DIE CASTINGS**
Ever been in doubt when choosing finish for die castings? Use the excellent data-tables highlighting this interesting article.

71 **HOW TO CUT COSTS, LABOR, TIME, & PART-REJECTS**
This is always welcome information for any manufacturer. Find out about the described finishing method and its benefits.

74 **METAL BONDED MEDIA FOR BARREL-FINISHING**
Have you ever wished for an ideal barrel-finishing medium? This may be the answer to a lot of hopes for such media.

DEPARTMENTS

4 Between the Lines
10 Casting About
13 Letters to the Editor
19 Book Reviews
64 Data in Ads
82 Useful Literature
88 New Products
102 Industry News
106 Opportunities

Precision Metal Molding

published monthly copyright 1958 by

THE INDUSTRIAL PUBLISHING CORP.

Editorial and executive offices: 812 Huron Rd., Cleveland 15, O.

IRVING B. HEXTER.....*president*
LESTER P. AURBACH....*executive v.p.*
EDWIN M. JOSEPH.....*vice president*
LEE HAAS.....*vice president*
ALAN J. KICHLER....*ass't. sec'y-treas.*

STAFF

David W. Velt ....publishing director
Philip R. Kalischer .....editor
Cliff Miller .....associate editor
Scholer Bangs .....western editor
672 So. Lafayette Park Pl.
Los Angeles 57, California
John H. Haselow ....assistant editor
N. G. Kiser .....circulation manager
R. V. Black ..mgr. reader service dept.

SALES OFFICES

Cleveland 15
812 Huron Rd., SU-1-9622
ROBERT SIMMONS

New York City 17
Rm. 835, 60 E. 42 St. MU 7-3420
LEE HAAS *vice president*
ARTHUR L. GOEBEL
V. R. STEIN *administrative asst.*

Chicago 11
Rm. 704, 520 N. Michigan,
WH 3-1655
CHARLES F. GEYER *manager*
KENNETH L. JONES

Los Angeles 57
Rm. 8, Granada Building
672 S. Lafayette Park Pl.,
DU 7-5104
ALAN T. CAZIER *manager*
JAMES L. MITCHELL

London, S.W. 1
31 Palace St., Westminster,
VI 2608
JOHN A. LANKESTER *manager*

SUBSCRIPTIONS in U.S. and possessions: $7, 1 year; $12, 2 years. Canada: $8 per year. Foreign: $7 per year, payable in advance in U.S. funds. U.K.: £3.50.0 per year payable in Sterling to London office. Single copies, when available: 1 to 10 — 75¢ each; 11 to 25 60¢ each; over 25 45¢ each.

AFFILIATED PUBLICATIONS: Aeronautical Procurement, Applied Hydraulics, Refrigeration & Air Conditioning Business, Flow, Industry & Welding, Material Handling Illustrated, Modern Office Procedures, Occupational Hazards, Welding Illustrated. Member BPA. Accepted as a controlled circulation publication at St. Joseph, Michigan. Not responsible for unsolicited editorial material. Please return Forms 3579 to 812 Huron Rd., Cleveland 15, Ohio.

BETWEEN THE LINES

The editor's viewpoint on articles in current and forthcoming issues

FORECASTING IS ALWAYS DANGEROUS. It always seems that you're wrong more than half the time. Maybe one reason for that is the yard stick used; so this year we have used a new one—the Tool & Die Industry. When a company spends a few thousand dollars for new die casting dies they intend to use them. They're expendable items you don't make up to put on the shelf against future needs. So it seems to us, if the tool and die shops are busy making die casting dies then the foundries are going to be busy in the near future. You'll find a report on these die shops starting on page 41.

ALSO IN THE FORECAST SECTION you will find a group of charts for twelve different industry groups. In these charts the consumption of die castings is compared with the rate of population growth in continental United States. These charts will help the custom die caster aim his sales efforts. Any industry group whose rate of consumption of die castings is only equal to or lower than the rate of population growth is a prime suspect as a potential customer. Of course don't neglect the others who are now using more die castings. This same article can show the designer where his industry group stands. If the use of die castings is low, maybe he is overlooking some good bets toward lowering costs. Start this feature on page 43.

THE TROUBLESOME QUESTION OF TOLERANCES will be discussed in another article in the October issue. This time we'll deal with tolerances on sinterings. The article has been prepared for us by one of the custom fabricators of powdered metal parts who knows where-of he speaks. It also carries the blessing of the Metal Powder Industries Federation so designers can use it safely and meet the capabilities of almost any fabricator.

THE OCTOBER ISSUE will also carry tabular material on the physical and mechanical properties of sinterings. This tabulation can be used for design purposes. We asked every company who submitted data to give material that the designer could safely use, not just test bar results. Every engineer concerned with the use of sinterings will want to save these tables.

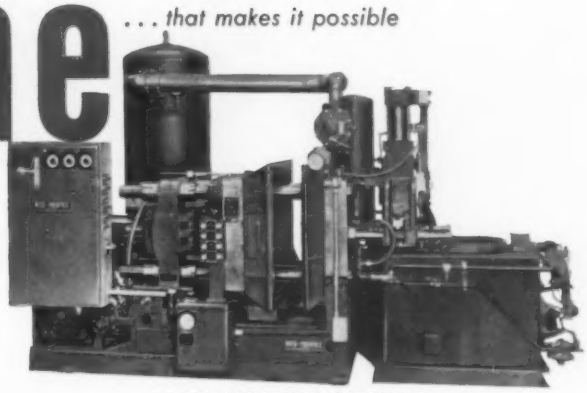
ONE OF THE ECONOMIES OF DIE CASTINGS is simple, low-cost surface finishing. An article, starting on page 67, reviews this very important subject. It was written for us by one of the leaders in the metal finishing field and is aimed at describing the best and lowest cost finishing system for any particular end use. A comprehensive chart summarizes all types of finishing procedures.

continued on page 37

REED VACUCAST *improves die casting quality*

machine

. . . that makes it possible



REED-PRENTICE VACUCAST

REEDS *offer you . . .*

- Stronger, denser zinc die castings
- Scrap costs reduced on hardware parts to be plated
- Improved skin surface reduces polishing costs
- Porosity reduced to acceptable limits
- Minimum loss of speed because of vacuum
- New die casting applications by designing with thinner wall sections

car

. . . that benefits

The Ford Motor Company's Edsel, one of the most distinctive medium priced cars on the road. Its unusual horizontal taillight is a distinguishing feature produced in a two-cavity die by the REED VACUCAST system.

1958 EDSEL

product

. . . of Ford Motor Company made on their 400 ton REED VACUCAST machine. REED vacuum die casting produces these two taillight housings with a single twelve pound shot in a two-cavity die. The more uniform surface finish results in higher quality chrome plating.

Write for full details on the REED VACUCAST system.

REED-PRENTICE

Division of PACKAGE MACHINERY COMPANY

EAST LONGMEADOW, MASS.

BRANCH OFFICES: New York • Cleveland • Chicago • Buffalo • Dayton • Dearborn • Kansas City • Los Angeles

For more information circle No. 71 on the Reader Service Card

Hollow Mill Maker finds

DBL-2
High Speed Steel

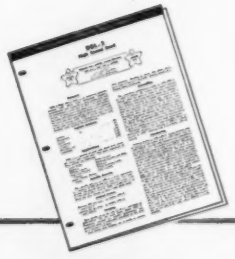
HARD, TOUGH and VERSATILE

The maker of these adjustable hollow mills required a steel that would give top performance in a variety of jobs—turning, tapering, facing, chamfering and trepanning. After thorough testing, Allegheny Ludlum's high speed DBL-2 was selected.

DBL-2 is an improved general-purpose high speed steel. It contains tungsten, molybdenum and vanadium in such proportions that it excels 18-4-1 for most applications. DBL-2's unusual combination of high hardness with toughness, its ability to hold a fine grain over a wide hardening range, and the fact that it easily machines many diverse types of stock, made it particularly well suited for this job.

In addition to these advantages, DBL-2 can be heat treated in the same furnaces and atmospheres as 18-4-1 without fear of harmful decarburization. These DBL-2 blades were heated to 2250 F., oil quenched and drawn twice at 1025 F. After heat treatment, blades easily machined such stock as aluminum, stainless steel, carbon steel, aircraft steel, plastics, bronze, screw stock, cast iron and brass.

There is an A-L tool steel to meet your toughest requirements. For further information call your A-L representative or distributor today, or write . . . .
Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.



Write for
BLUE SHEET on DBL-2

Gives all needed handling and shop treatment details on DBL-2. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc.

ADDRESS DEPT. PM-9

For nearest representative, consult Yellow Section of your telephone book.

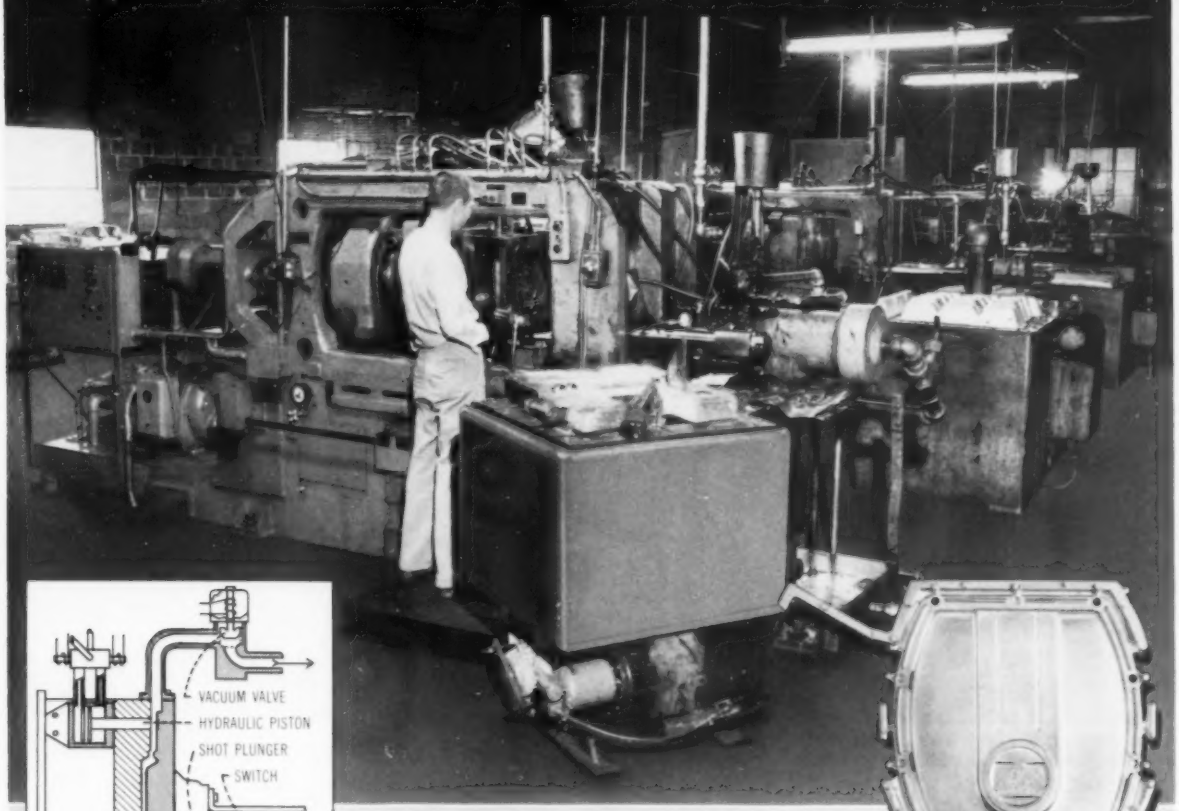
For complete **MODERN** Tooling, call
Allegheny Ludlum

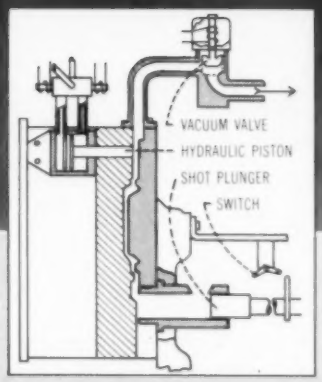
WSW 7105

AL® FINE TOOL STEELS SINCE 1854

For more information circle No. 5 on the Reader Service Card

Another SUCCESSFUL VACUUM SYSTEM *applied to* LESTER MACHINES





Metal is ladled. Mushroom switch is depressed, actuating shot plunger and opening VACUUM VALVE to evacuate air, humidity and gases. As SHOT PLUNGER shoots forward, it trips SWITCH to shut VACUUM VALVE and shift HYDRAULIC PISTON in die to seal off metal flow. System works equally well on zinc. Casting on right is aluminum meter cover being run on 400 ton Lester at 240 shots per hour.

DESCRIBED AS A SERVICE TO DIE CASTERS

Here is an inexpensive high-vacuum system for use on Lester Die Casting Machines. The process was developed by Morton Manufacturing Co. of Omaha, Neb., for use on the 400 ton Lesters in their shop, and is now being offered for sale by them.

As successfully applied to a number of parts, the system evacuates the cavity of 95% of barometric pressure through a large overflow channel as the metal fills the die. When the cavity is filled, a switch is tripped to simultaneously shut off the vacuum and move a hydraulic piston in the overflow channel into position to seal off the flow of metal.

The system (patent applied for) incorporates the use of a Morton-developed self-expanding plunger tip, which seals against air leakage through the metal cylinder. No perimeter seal is required for the die.

It is noteworthy that this process is completely dependent on a machine with a reliable clamp, capable of holding the die faces rigidly together to prevent flash and vacuum leakage. In this respect, the Lester machines are ideally suited to the process.

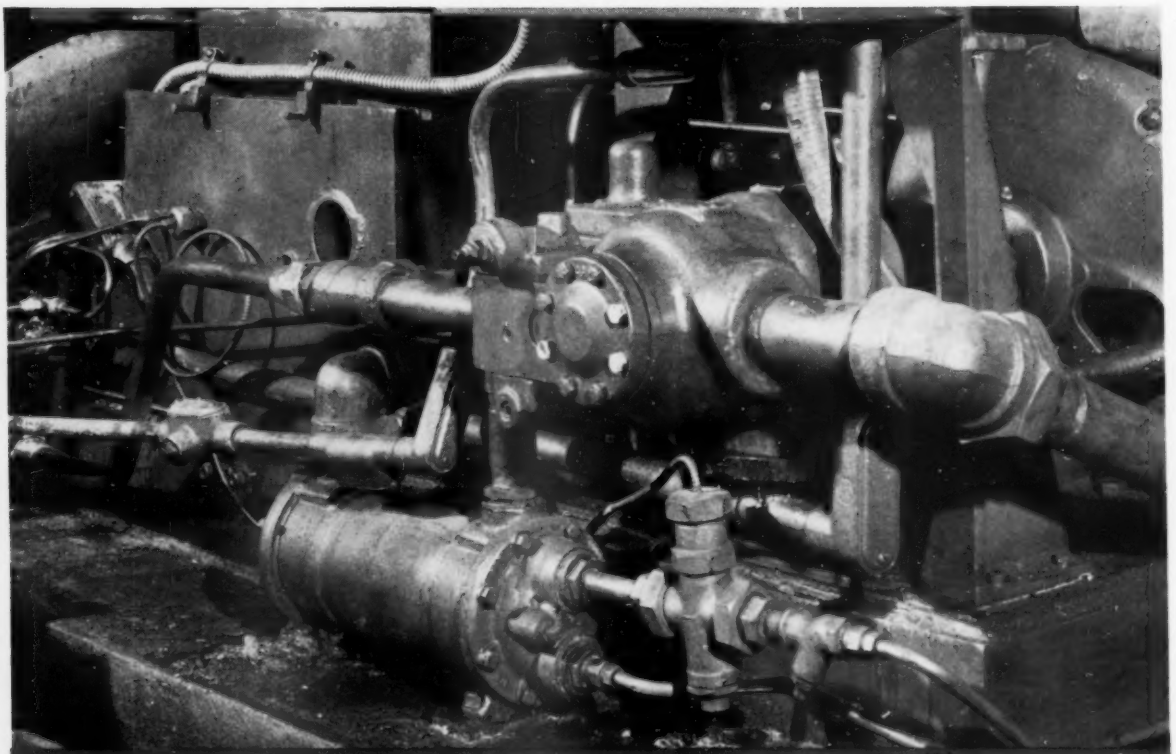
Here is another valuable tool for die casters. For additional details on this process, write Morton Manufacturing Company. For information on high quality die casting machines, write

LESTER-PHOENIX, INC.

2708-B CHURCH AVENUE • CLEVELAND 13, OHIO

Agents in principal cities throughout the world

For more information circle No. 59 on the Reader Service Card



Die caster takes Houghto-Safe out—TO SAVE MONEY ...then brings Houghto-Safe back—TO SAVE PUMPS

In three years of continuous operation with Houghto-Safe 600 Series water-glycol fluid, the only downtime for this die casting machine was caused by a broken line. Houghto-Safe sprayed on molten metal. With oil-base fluid, it would have meant a serious fire. But production was resumed within a few hours, because Houghto-Safe didn't burn. Then came the decision to try a lower cost oil-water emulsion (Not Houghton's).

Savings appeared worthwhile when the oil-water fluid was installed. But in service, the fluid separated. Oil stayed at the top of hydraulic supply tanks. Water stayed at the bottom.

Result: fast and excessive pump wear. Within 6 months, downtime repairing pumps and waiting for pump parts became so great that the decision was made to replace the oil-water with a fluid with better lubricating power.

Houghto-Safe 600 Series fluids were again chosen, on the basis of their previous trouble-free performance and complete safety.

A costly test, but it shows why Houghton Engineers recommend Houghto-Safe 600 Series fluids for 85% of all applications. Houghto-Safe 1000 Series phosphate ester type fluids are recommended where temperature or design conditions do not permit the use of water-base fluids.

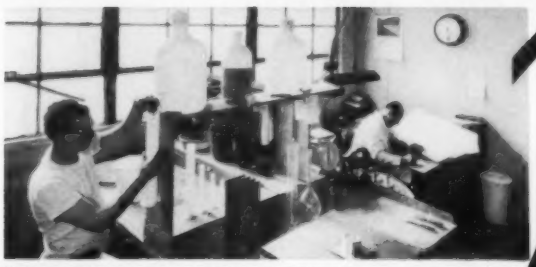
You can depend on Houghton hydraulic fluids for the best solution to hydraulic safety problems, for both best value and best service. Write today for Houghton's new hydraulic fluids bulletin. Get acquainted with the most complete line of fire-resistant and oil-base hydraulic fluids available from any single supplier today. Address: E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

HOUGHTO-SAFE & HYDRAULIC PACKINGS ... products of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service ...

For more information circle No. 45 on the Reader Service Card



ATOLS

Ultra-Precision MOLDS

Complete Designing and Engineering Service

Precision Dependability

Modern Plant and Equipment
INCLUDING KELLER DUPLICATORS

Shaw Process Licensee

Producing Mold and Tool Components by the Shaw "Refractocast" Process In Alloy Steels
Fast Delivery—Low Cost

Highly Skilled Moldmakers

Serving the Die Casting and Plastics Industries for a Quarter Century with the Finest Molds Produced Anywhere.

ATOLS
TOOL
&
MOLD
CORP.

No Job Too Small
No Job Too Large
No Job Too Complicated

Your Inquiries Promptly Answered

ATOLS TOOL and MOLD CORPORATION

5005 WEST ARMITAGE AVENUE • CHICAGO 39, ILLINOIS • BErkshire 7-0800

For more information circle No. 9 on the Reader Service Card

ALUMINUM INGOTS ARE GETTING BIGGER AND BIGGER. The one shown here was recently cast by the Aluminum Co. of America for Thiokol Chemical Corp. It weighs 24,000 lbs. and is 38½ in. diameter and 205 in. long. The alloy is 2014. Thiokol will use the huge chunk of metal to fabricate a part that will help improve the performance of missiles and rockets.

CASTING ABOUT

technical news of applications & processes involving precision metal moldings

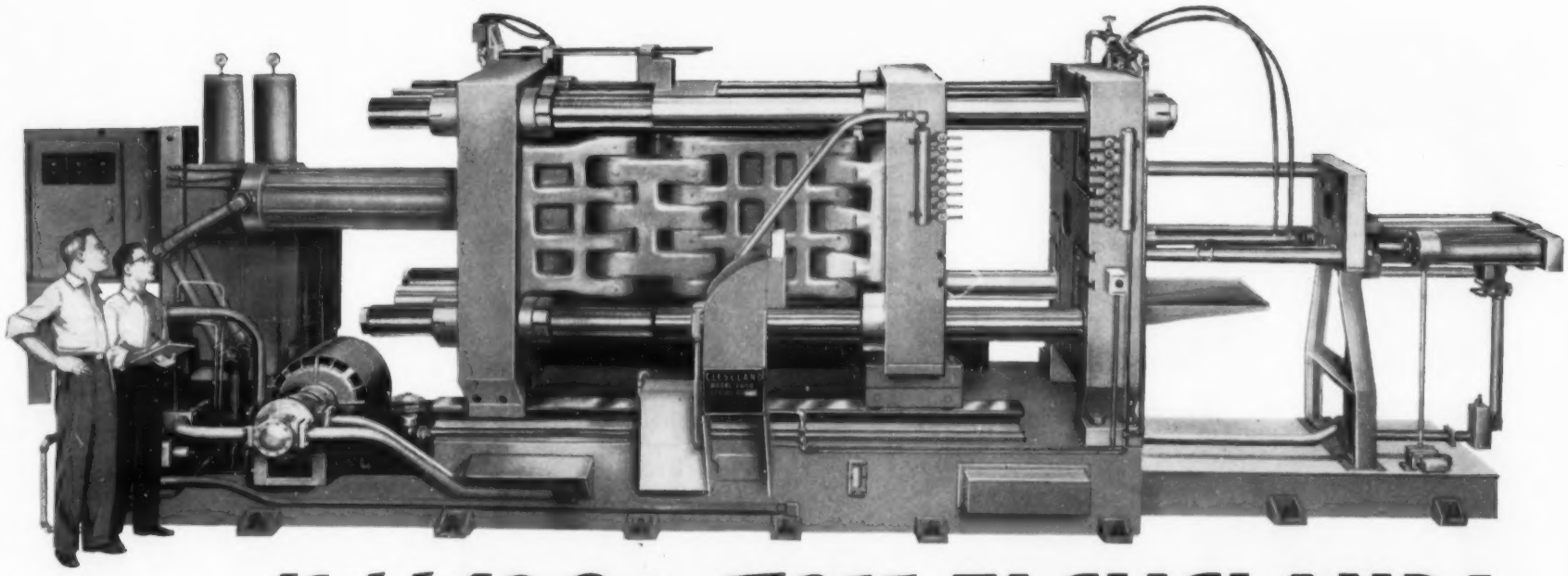
IS BERYLLIUM THE NEXT WONDER METAL? It could become that if a few difficulties are overcome. Beryllium's potential usefulness stems from its high melting point of over 2300°F and properties that make it more elastic than steel and stronger, pound for pound, than titanium. Its disadvantages are toxicity to humans, brittleness, and the present high price. If these disadvantages can be overcome, beryllium may become an important structural material for aircraft.

THE IMPORTANCE OF VACUUM TECHNOLOGY in modern industry has been recog-

nized by at least one major University. Students in metallurgical engineering and nuclear engineering at Cornell University will be able to learn the latest techniques in vacuum melting and refining of metals with the new Stokes furnace which was recently delivered. The furnace, induction heated, is a complete unit with its own vacuum pumping system and a 30 kw power supply. The crucible capacity is 17 pounds of metal. It is one of the first vacuum melting units to be installed as an integral part of a university engineering laboratory for day to day use by undergraduate students. Previous installations of this type have been on contract research generally carried out by graduate students.

ARE BLAST FURNACES ON THE WAY OUT? Certainly the cost of replacing one today makes any process for winning metal from iron ore without a blast furnace look pretty attractive. A number of companies are looking into this possibility and all of them are working through powder metallurgy to some degree. One of the latest to be announced is the R-N direct reduction and beneficiating process. The process was developed by the N-R Corp., a jointly owned venture of Republic Steel Corp. and National Lead Co. Ores running as low as 35% total iron have been processed to give a product, most of which is suitable for open hearth feed stock (75% of the product has 91% total iron, 86% metallic iron. The 25% balance is now blast furnace stock with about 80% metallic iron content). On high grade feed, above 60% total iron, the entire product is open hearth grade.

continued on page 77



THE *NEW* 1000-TON CLEVELAND!

Hydraulic Die Casting Machine for Aluminum

Here is yet another outstanding Cleveland achievement for the rapid production of large aluminum die castings of the highest quality . . . for castings weighing up to 25 lbs.! With many advanced engineering features, its massive construction and extreme rigidity, this biggest, newest Cleveland is capable of fast, smooth performance under continuous, around-the-clock operation.

Engineering highlights include: heavy, fabricated one-piece base; automatic lubrication; manifold hydraulics; leak-proof piping; 40 hp. motor; two, large capacity hydraulic pumps; 230 gal. hydraulic reservoir; filter capacity four times pump capacity; automatic timing remote control panel. Get detailed specifications now. Write direct or call in a Cleveland sales engineer.

Major Specifications

Locking pressure (strain gauge tested)	1000 tons
Size of die plates	67″ x 67″
Die thickness (max.—min.)	45″ – 24″
Die opening	20″ to 30″
Space between tie bars	42″ x 42″

New shot intensifier: Plunger can be adjusted to attain any speed up to 480 ft./min. At any predetermined plunger position, intensifier can generate plunger pressures up to 26,000 lbs./sq./in. Intensifier pressure adjustable.

Remember, Clevelands Cut Costs!

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4952 Beech Street
Cincinnati 12, Ohio
SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

For more information circle No. 22 on the Reader Service Card

PDQ

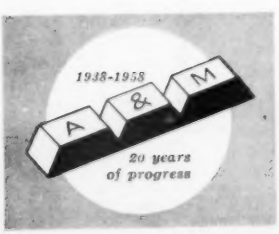
PDQ

That is what you get when you buy A & M Aluminum Alloy Ingot

Price Our prices for premium aluminum alloy ingot are always reasonable. And at A & M, price is never permitted to affect our high, uncompromising standards of quality.

Dependability Your delivery schedules, as well as your specifications, are zealously adhered to. We maintain our own truck fleet to insure on-time deliveries.

Quality Aluminum alloy ingot by A & M is produced under the most exacting quality control requirements. Our Quantometer guarantees accurate analysis in every ingot.



Producers of Quality Aluminum Alloys Since 1938

ALUMINUM and MAGNESIUM INC.

1 HURON STREET • P.O. BOX 720 • SANDUSKY, OHIO • TELEPHONE: MAin 6-4610

P.O. Box 156 • Corona, California • Telephone: REdwood 7-2922

For more information circle No. 11 on the Reader Service Card

LETTERS

the readers' forum

DIE CAST PULLEYS

We are in the market for a quantity of die cast aluminum sheaves approximately 4" in diameter with groove for V belt or ¼" wire rope.

We understand there are several manufacturers who make sheaves or hubless pulleys of this type. Could you tell us who they are?—C. T. M. gen. mgr.

The names of several companies who, we believe, can furnish these sheaves have been sent. Any manufacturer who wishes to contact this reader can do so through PMM.—Ed.

CASTING LEAD AND SOLDER

I am interested in casting lead and solder in very small forms and with a fine finish. Any information you may have would be appreciated.—W. S. production eng.

Since the reader did not say whether he planned on large or small quantities of any fixed design it is not possible to determine whether he should use die or permanent mold casting. He has been referred to the manufacturers of cast dies as a possible source of molds and to several of the machine builders who make small die casting machines.—Ed.

DIE CASTING DIE RENTAL

Please let us know what companies you know of who rent molds for zinc and aluminum die castings.

In the plastics industry there are some companies that own stock molds which they rent. Is there such a company which deals in zinc and/or aluminum die casting dies.—H. S. Jr., Mexico.

We don't know of any companies engaged in this die rental business. Recently, however, a reader in South America was interested in the purchase of used die casting dies and several companies offered these dies for sale. The names of these concerns have been furnished to H. S. Jr.

continued on page 14

HYDRAULIC SAFETY BULLETIN

PROTECT HYDRAULIC EQUIPMENT, REDUCE REPLACEMENT COSTS WITH IMPROVED UCON HYDROLUBES

Ucon hydrolube fire-resistant fluids have excellent corrosion- and wear-resistance

Wear and corrosion are responsible for a large slice of the replacement dollar spent on hydraulic equipment. Now, Ucon hydrolubes provide wear and corrosion resistance equal to petroleum oils *plus the additional protection of fire-resistance.*

HYDROLUBES PREVENT CORROSION

Ucon hydrolubes 150-CP and 275-CP provide improved corrosion protection in both liquid and vapor phases over previous hydrolube formulations. Ucon hydrolubes have no adverse effect on steel, cast iron, aluminum, brass, or copper under normal operating conditions. They successfully pass the standard ASTM test for rust-preventive characteristics (ASTM Designation D 665-54). The inhibitors incorporated in the hydrolube fluids not only essentially eliminate rust formation from the water present, but also aid in the reduction of wear.

WEAR-RESISTANCE TOPS

Actual plant installations in a wide variety of industrial hydraulic systems as well as a large number of controlled laboratory tests have shown that wear in vane-type pumps is significantly reduced with Ucon hydrolubes 150-CP and 275-CP in comparison to previous hydrolube formulations. These results have been confirmed in 750-hour—1000 psi standard rotary vane tests at 150°F. conducted by independent laboratories. These tests show that the wear-resistance of "CP" hydrolubes is in the same general range as petroleum hydraulic oils.

Test Results

	Inhibited Petroleum Hydraulic Oil	Ucon Hydrolube 150-CP	Ucon Hydrolube 275-CP
Viscosity at 100°F.,S.U.S.	216	158	276
Weight Loss 12 Vanes	34 mg.	17 mg.	30 mg.
Eccentric Ring	125 mg.	28 mg.	72 mg.
Total	**159 mg.**	**45 mg.**	**102 mg.**

HYDROLUBES ARE ECONOMICAL

Ucon hydrolubes are the economical answer to fire-resistance in hydraulic fluids. Most commercial hydraulic equipment can be easily converted to Ucon hydrolubes with a *minimum of time and expense.* And, Ucon hydrolubes have no harmful effects on neoprene or most other standard packing materials. Reduced leakage losses also have been frequently reported. Ucon hydrolubes are approved by Factory Mutual Laboratories.

Get all the facts on Ucon hydrolubes. Write for the booklet, "Ucon *Hydrolubes Spell Safety*." Address . . . Department B.

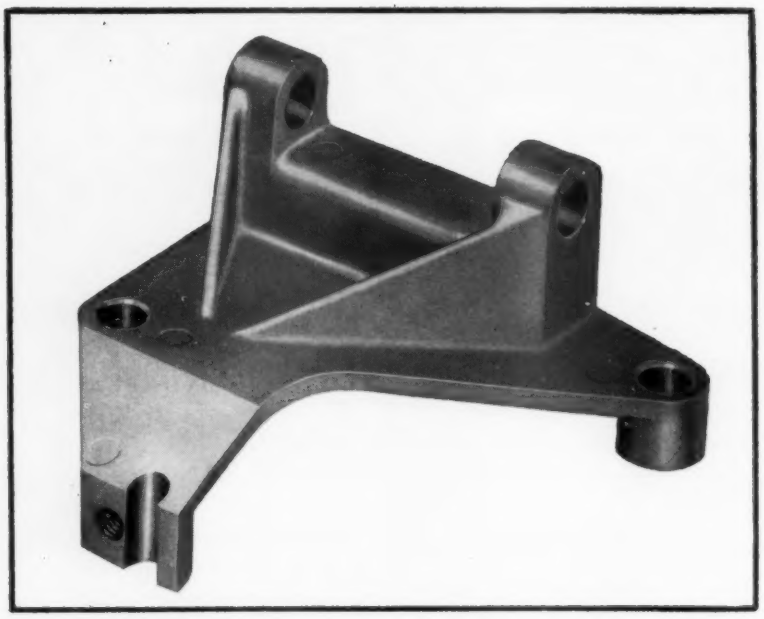
UNION CARBIDE CHEMICALS COMPANY

DIVISION OF UNION CARBIDE CORPORATION

30 E. 42nd Street, New York 17, New York

The terms "Ucon" and "Union Carbide" are registered trade marks of UCC.

For more information circle No. 80 on the Reader Service Card



Simple for Die Casting — Complex and expensive by any other method

How else could you maintain close tolerances, keep costs in line with mass production processes and still keep the design flexibility the job calls for?

Only die casting can do it!

The manufacturer who needed this part knew, from American Die Casting Institute Product Standards,* that his requirements were within the capabilities of the process. Then he asked for application facts from Twin City engineers. By asking he saved money.

When you plan parts that call for precision, accuracy, flexible shapes . . . contact Twin City Die Casting. Twin City engineers can help you *design for die casting* to eliminate machining and finishing costs. They can take your part to any finishing stage you may desire thanks to Twin City's complete facilities.

For die castings, contact Twin City . . . you can probably save money. Many customers have.

*Product Standards available from Twin City Die Castings upon request.

. . . only DIE CASTING can
✓ cut your costs
✓ offer such flexibility
✓ provide such accuracy

LEADING DIE CASTERS IN THE UPPER MIDWEST

TWIN CITY DIE CASTINGS CO.

3351 TALMADGE AVE. S. E. • MINNEAPOLIS 14, MINN. • PHONE MI 6-7528

RESEARCH PARTICIPANT

For more information circle No. 63 on the Reader Service Card

LETTERS

continued from page 13

If any of our readers know of a die rental service we will be glad to forward the information to our reader.—Ed.

AIRCRAFT CASTING ASSOCIATION

How do I contact the Aircraft Casting Association mentioned on page 42, July issue? J. L. E.

This association can be contacted through Mr. Norman Slichter, Pacific Alloy Engineering Co., El Cajon, California.—Ed.

HIGH PRESSURE GEAR PUMPS

In the May issue of your magazine, on page 33, gears for an Eaton pump are illustrated. Can you let me know which firms in the United States build such gears into high pressure pumps and up to what pressures pumps with sintered gears are built. Can you also let me know the names of USA manufacturers of these gears so that I can get information on them.—M. W. Frankfrut, West Germany.

Both Eaton Mfg. Co. and Hydreco Div., New York Air Brake Co. build these pumps in pressures up to 1000 to 1500 psi. Most fabricators of sinterings can make the gears and a listing of companies has been sent to this reader.—Ed.

NEW ALUMINUM ALLOY

We are very much interested in an article in PMM for March, 1958, "A New High-Strength Aluminum Bearing Alloy." Can you send me another copy of this issue.—G. L. H., engineering dept.

CAST MOTOR FRAMES

We have a project here involving a new electric motor which would require that the laminated stack be an integral part of the cast aluminum frame.

In other words, the frame or case would be die cast around the laminated stack making a complete, one piece frame construction. Since there is some doubt here of troubles that may be encountered we

continued on page 107

ACHESON

dispersions digest

Reporting uses for

dag BRAND DISPERSIONS

COLLOIDAL GRAPHITE, MOLY-SULFIDE, VERMICULITE, AND OTHER SOLIDS

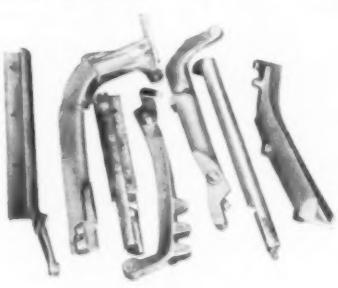
SUPERIOR CASTINGS, LONGER DIE LIFE ATTRIBUTED TO 'DAG' DISPERSIONS

Die casters and molders are expressing a growing preference for Acheson 'dag' brand colloidal dispersions. The consistent high quality of these products and the multiple benefits they offer have obsoleted most other mold cavity coatings. As outlined below, Acheson dispersions greatly aid in the manufacture of more uniformly sound castings having smoother surface finishes, facilitate metal flow and parting, and consequently extend the effective service lives of the dies and molds on which they are used.

Acheson 'Prodag'®, spray-applied on permanent molds at Paragon Aluminum Corporation, has given them consistently higher quality castings and fewer rejects.

Better surface finish with 'Prodag' permanent mold coating is just one of the reasons why Paragon Aluminum Corporation, a Division of Detroit Harvester Company located at Monroe, Michigan, switched to this Acheson product. After four years of experimentation with other mold washes, Paragon chose 'Prodag' — Acheson semi-colloidal graphite in water — and has used it constantly the past seven years. The reasons for its choice are these; uniform consistency, excellent heat-transfer quality, and its hard, smooth, tenacious film which resists flaking and provides easier parting characteristics.

With about 95 per cent of its annual output of more than two million pounds of castings going to the automotive industry, Paragon must insist upon quality. 'Prodag' helps to maintain this standard. These parts for convertible automobile tops are precision-molded from both 355 and 319 aluminum alloy. Molds are preheated before each day's run to 600°F and the casting cycle maintains this temperature. The 'Prodag' dilution ratio is 1 to 4 parts water and is applied to the molds with a commercial spray gun. Aside from occasional touchup at points of greatest wear, this coating lasts through the entire run. Because of the physical contours involved in these comparatively small, light castings, they require rapid cooling in certain areas to insure uniform strength. The 'Prodag' coating — with its proven fast heat transfer ability — allows the castings to cool without breaks or pinholes. And by parting more easily, the high-finish castings which result have given Paragon Aluminum products wide acceptance in this demanding industry.



Typical parts cast at Paragon Aluminum include these automobile convertible top braces. More uniform strength, better finish, and fewer rejects result from this company's use of Acheson 'Prodag'.

If you have a metal casting problem, call in your Acheson Service Engineer. Or if you prefer, write direct for additional information contained in our Bulletin No. 425. Address Dept. PMM-78.

'dag' and 'Prodag' are trademarks registered in the U.S. Patent Office by Acheson Industries, Inc.

Colloidal graphite increases die life because of its stability at high temperatures, excellent lubricating qualities, and its ability to prevent adhesion and the scrubbing effect of hot metal. This cannot be said of conventional petroleum compounds which either decompose rapidly at temperatures above 300°F or do not possess the required lubricity necessary under good die casting procedures. It will not volatilize when in contact with the hot metal and cause pock marks due to gas formation. It will perform when present in extremely thin films which will not affect dimensions or cause discoloration of the parts being cast. And since it does not volatilize or otherwise be destroyed in the casting process, it does not need to be applied as often as other lubricants. This fact alone has often increased production as much as 25%. Investigate the use of an Acheson colloidal dispersion in solving your die casting problem . . . *It probably is the very answer you need.*

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

50th

Offices in: Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee New York • Philadelphia • Pittsburgh • Rochester • St. Louis • Toronto

For more information circle No. 3 on the Reader Service Card

"Cellulubes are against fire

SAYS RICHARD A. PARKER, CHIEF ENGINEER PARKER WHITE METAL COMPANY, ERIE, PENNA.

"They also curtail corrosion . . . provide longer pump life and valve wear."

"In our hydraulic die-casting operation—involving open flame, temperatures to 1,400 degrees F, and molten metals—we consider it absolutely essential to use flame-resistant Cellulube for power transfer," continues Mr. Parker. "And with Cellulube we have no gummy valves, clogged strainers, or corroded reservoirs that characterized some of the fluids we formerly used."

This performance is typical of what you can expect from Celanese Cellulubes, which were developed to assure the safety of fire-resistance, with excellent lubricity and the dependability of unchanging operational viscosity. They are available in six controlled viscosities: 90, 150, 220, 300, 550, and 1,000 S.U.S. at 100°F.

Why not evaluate Cellulubes for your own operations? Just use the coupon to describe the application you have in mind and request technical data and samples.

Celanese® Cellulube®

For more information circle No. 21 on the Reader Service Card

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION
DEPT. 589-S, 180 MADISON AVENUE, NEW YORK 16, N.Y.

Please send me:

☐ New Technical Bulletin "Celanese Safety Series" ☐ Sample, of_____viscosity.

Name & Title_____

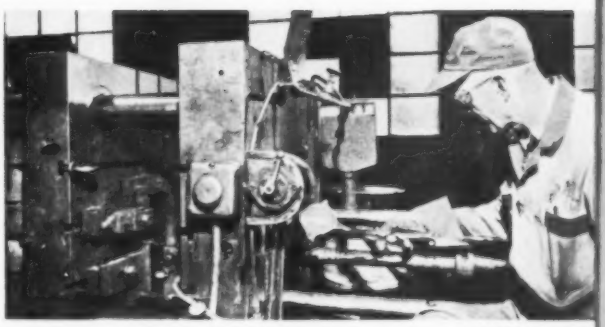
Company_____

Address_____

City_____ Zone_____ State_____

Application in mind_____

our insurance disaster"

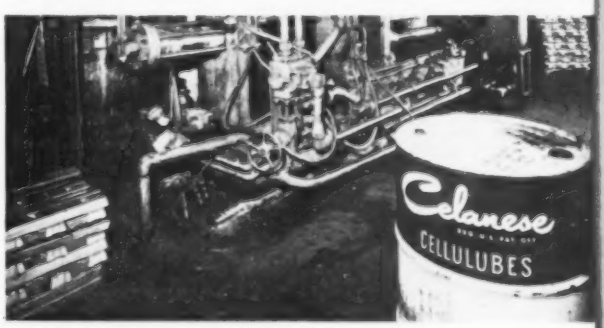


BETWEEN THIS . . .

Operator ladling molten metal into the shock chamber of 400-ton die casting machine. "Given the tremendous pressures under which the hydraulic fluid forces the ram home . . . we must prepare against a possible line rupture. It is vitally important that we use fire-resistant Cellulube in this operation."

AND THIS . . .

Operator removing a casting from opened die. When the ramming operation is completed, the Cellulube is by-passed to the reservoir, ready for the next one. "Open flame coupled with leakage sometimes resulting from the tremendous pressures creates a serious hazard. Cellulube is our insurance against this hazard . . ."



. . . THIS!

Cellulube 150 is used in the Parker White Metal Company's 400- and 500-ton die-casting machines. Each machine uses 100 gallons of Cellulube. "Its performance has been completely satisfactory . . ." says Richard A. Parker, Chief Engineer.

FM

Factory Mutual-Approved
(Cellulubes 150 and 220)

Celanese CHEMICALS

Celanese Corporation of America, Chemical Division, 180 Madison Avenue, New York 16, N.Y.
In Canada: Canadian Chemical Co., Limited, 2035 Guy Street, Montreal, P. Q., Canada.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N.Y.

CELANESE CELLULUBES

Horse Head® ZAMAK ZINC ALLOY

Buy the Original!

It's made with

Horse Head Special Zinc

THE NEW JERSEY ZINC COMPANY

Established 1848

160 Front Street, New York 38, N. Y. – 221 North La Salle Street, Chicago 1, Ill.

For more information circle No. 66 on the Reader Service Card

BOOKS

AUTOMATION IN PRACTICE, By S. E. Rusinoff, American Technical Society, Chicago, Ill. Price $6.50

For the first time the methods and machinery of automated production in the metal industries are brought together. The book is an integrated survey of the latest automation techniques as they are actually applied in the various manufacturing and metal working processes. With the emphasis on practice, the material is treated in terms of particular processes rather than in terms of particular industries. There is no practice or process described which has not been a successful solution to a particular problem or group of problems in manufacturing.

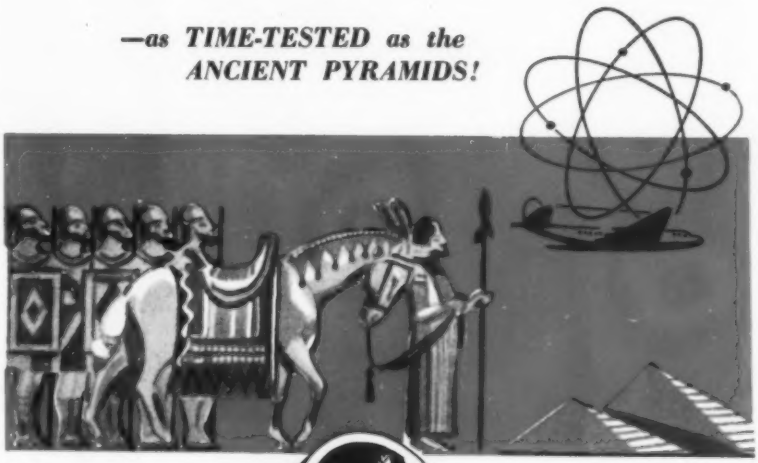
The first part of the book is concerned with basic principles of automation insofar as they are relevant to manufacturing processes. The second part of the book deals with specific manufacturing processes, such as metal working, heat treating, casting and the production of ferrous and non-ferrous metals. The final chapter deals with devices and systems for achieving automatic inspection and quality control in manufacturing processes.

CREEP AND FRACTURE OF METALS AT HIGH TEMPERATURES, Philosophical Library, New York, N. Y. 1957. Price $12.00

This book contains the proceedings of a Symposium on the Creep and Fracture of Metals at High Temperatures which was held at the National Physical Laboratory in 1954. The twenty-two papers presented at the symposium are divided into four sections: Section I – Deformation Processes in Simple Materials; Section II – Creep Resistance of Complex Materials; Section III – Theory of Fracture; Section IV – Work on Tertiary Creep and Fracture. The discussion on each paper which followed its presentation was taken from written copies of contributors remarks and the record taken of the proceedings.

NEW as the ATOM

—as TIME-TESTED as the ANCIENT PYRAMIDS!



From the crude products of the early Bronze Age to the specialized, highly technical requirements of our present Atomic Age, Crucible Melting always has been the most flexible, reliable and economical means of obtaining high purity metal—in any quantity—quickly and economically.

Modern jet-age technology demands even tighter tolerances on alloys, purity and temperature . . . standards that can be met easily and economically by Crucible Melting.

These manufacturers can supply all of your crucible melting requirements.

ELECTRO REFRACTORIES & ABRASIVES COMPANY
LAVA CRUCIBLE-REFRACTORIES COMPANY
ROSS-TACONY CRUCIBLE CO.
VESUVIUS CRUCIBLE COMPANY
AMERICAN REFRACTORIES & CRUCIBLE CORPORATION
JOSEPH DIXON CRUCIBLE CO.

Crucible Manufacturers' Association

—CLIP and MAIL for FREE Brochure—

CRUCIBLE MANUFACTURERS ASSN.
20 West 43rd Street, N. Y. 36, N. Y.

- Send "Crucible Charlie" Brochure #1 "Crucible Care".
- Send "Crucible Charlie" Brochure #2 "Charging & Melting".

NAME.....

POSITION.....COMPANY.....

ADDRESS.....

CITY.....STATE.....

For more information circle No. 25 on the Reader Service Card

die cast from TADANAC ZINC

"THE INNER CIRCLE OF SAFETY"

An automobile horn may startle and annoy you . . . or it may save your life!

Following the curve of the steering wheel just inches away from the driver's hand, the horn ring on a modern automobile stands ready to sound a warning to pedestrians and other vehicles. It's strong, attractive and durable—die cast in Zinc!

For flexibility of design, combined with the economy of accurate, low temperature, high speed operation, die casters choose alloys of Zinc. And, for consistent high quality, assured supply and prompt delivery, Tadanac Zinc is the preferred brand for die casting alloys!

If you require information or assistance regarding your Zinc die casting operations, contact our Technical Service Staff. Your inquiries will receive prompt attention.

THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED

COMINCO

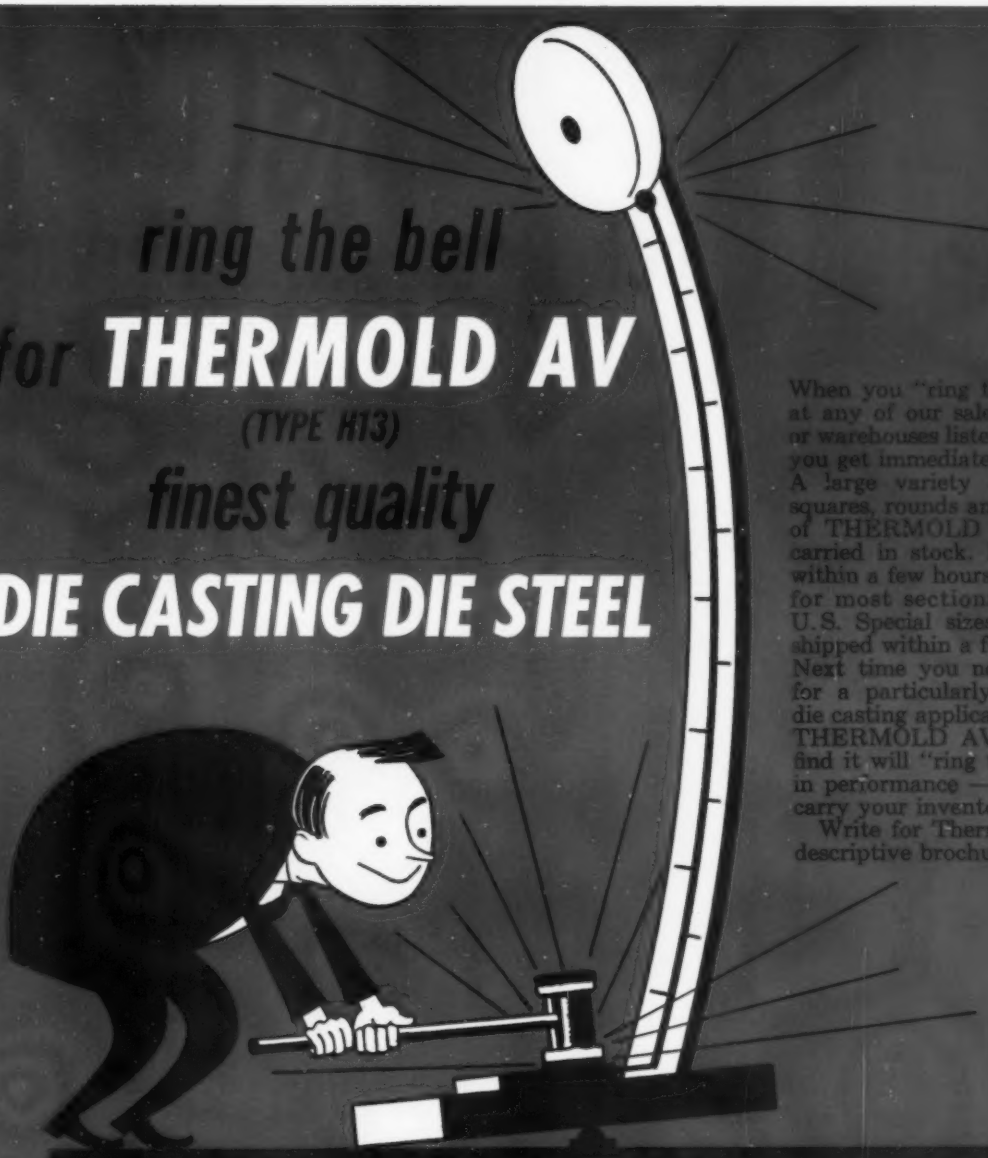
METAL SALES DIVISION: 215 ST. JAMES STREET W., MONTREAL 1, QUEBEC, CANADA
Sold in United States by: AMERICAN METAL CLIMAX, INC., 61 BROADWAY, NEW YORK 6, N.Y., 1 N. LASALLE STREET, CHICAGO, ILL. • THE AMERICAN METAL COMPANY, LIMITED, OF MICHIGAN, 4172 PENOBSCOT BUILDING, DETROIT, MICHIGAN • THE AMERICAN METAL COMPANY, LIMITED, OF CALIFORNIA, NATIONAL OIL BUILDING, SIXTH STREET AND GRAND AVENUE, LOS ANGELES 17, CALIFORNIA

TADANAC ZINC SHAPES THE THINGS TO COME

8109

For more information circle No. 23 on the Reader Service Card

ring the bell for THERMOLD AV (TYPE H13) finest quality DIE CASTING DIE STEEL



When you "ring the bell" at any of our sales offices or warehouses listed below, you get immediate service. A large variety of flats, squares, rounds and billets of THERMOLD AV are carried in stock. Delivery within a few hours is usual for most sections of the U.S. Special sizes can be shipped within a few days. Next time you need steel for a particularly critical die casting application, try THERMOLD AV. You'll find it will "ring the bell" in performance — and we carry your inventory.

Write for Thermold AV descriptive brochure.

CALL ANY OF THESE WAREHOUSES AND OFFICES

Bridgeville	CAnal 1-8000	Indianapolis	MElrose 8-7597	Pittsburgh	LOcust 3-5550
Buffalo	SUmmer 2275	Los Angeles	HOllywood 4-9191	Rock Island	6-1221
Chicago	HUmboldt 9-2335	Milwaukee	SPring 1-3140	Springfield (N.J.)	DRexel 6-3000
Cleveland	LAfayette 4-4444	New York	WOrth 4-1970	St. Louis	MIssion 7-4733
Dayton	BAldwin 2-7451	Norfolk	MAdison 2-5347	Syracuse	GRanite 2-7335
Detroit	TYler 4-0050	Philadelphia	MIdway 9-2500	Titusville	7-2221
Hartford	CHapel 9-8613			Worcester	PLeasant 6-3563

UNIVERSAL-CYCLOPS STEEL CORPORATION

BRIDGEVILLE, PA. TITUSVILLE, PA.

For more information circle No. 81 on the Reader Service Card

NOW...

Dodge Gooseneck Resleeving Service

Now available to die casters everywhere is Dodge's "near-as-your-phone" service for resleeving *any* type or make of gooseneck quickly . . . efficiently . . . economically.

If you are tired of long delays, inadequate materials and poor workmanship, we invite you to investigate the advantages of this newest Dodge service . . . *now.*

Sleeves are normally furnished in Nitralloy® 135 mod., nitrided to Rockwell 62-64 "C" and honed (or other material if specified). All sleeve I.D.'s are nominal—we machine to your requirements. For peak performance, all sleeves are inserted with a .004-.006" shrink fit.

To help speed delivery, Dodge stocks a wide range of "standard" goosenecks and sleeves.

Why not look into this unique resleeving service today? Call us without obligation for price and complete details, or write.

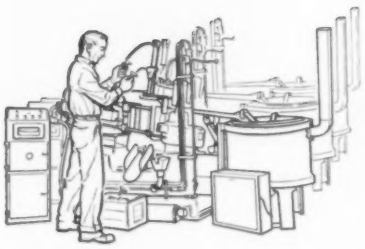
DODGE STEEL COMPANY
Dodge Products Division
6501 State Road, Philadelphia 35, Pa.
Phone: DEvonshire 2-2200

THE MOST IMPORTANT ALLOY IN A STEEL CASTING IS QUALITY

For more information circle No. 32 on the Reader Service Card

total automation*

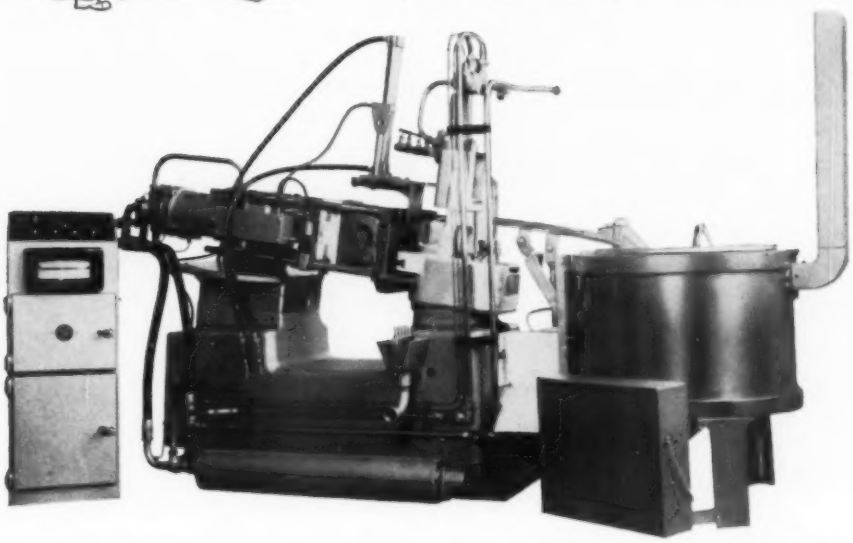
comes to die casting
with the continuously recycling



DCMT RAM

fully automatic die casting machine

Up to 1,500 shots per hour without an operator!



***For the first time**
a small and medium parts die casting machine that

- **cleans itself**
- **lubricates itself**
- **water-cools itself**
- **recycles itself**
- **unloads itself**
- **feeds itself** new supplies of molten metal on demand

Now...you can have a **completely automatic** die casting operation for small and medium zinc alloy parts. You can set **entirely new production levels,** bid for a **much larger share** of the growing up-to-one-pound die casting market; **compete on jobs** which, until now, were lost to other production methods!

Now...**one setup man** can service a **bank** of **high-speed DCMT RAM Automatics.** Piece by piece, this means lowest **labor** cost, lowest **inspection** cost, lowest **die amortization** cost; lowest **trimming** cost and **highest casting output** per unit of floor space! It also means **minimum rejects** and **uniform quality** throughout.

Keep up with **progress** in the die casting field! Write today for an illustrated booklet giving details and specifications of the exciting new DCMT RAM Automatic.

B.I.C. ENDORSED QUALITY

DCMT

SALES CORP.

Division of British Industries Corp.
Port Washington, New York

DCMT SALES CORP., Dept. DM 368
Division of British Industries Corp., Port Washington, New York

Gentlemen: Please send "RAM Automatic" booklet.

Also send literature on these other DCMT die casting machines:

☐ **IMP/96 mk II** (fully air-operated)

☐ **ADC 56 Rotorcaster** (for casting aluminum around rotors of small motors)

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

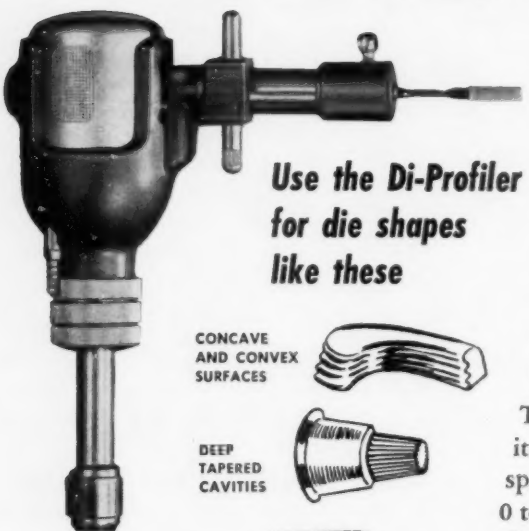
For more information circle No. 15 on the Reader Service Card

"Our Di-Profiler paid for itself in less than 3 months"... says Admiral Die Castings, Chicago

THE Di-Profiler
RECIPROCATING HAND MACHINE

Illustration shows diamond file reciprocated by the Di-Profiler operating at 75 strokes per second, with stroke length of 3/16". Tool is finishing detail on ejection half of die for upper guard of portable electric saw.

for time-saving, precision die making and maintenance



Use the Di-Profiler for die shapes like these

CONCAVE AND CONVEX SURFACES

DEEP TAPERED CAVITIES

SHOULDERS AND RECESSES

INTRICATE DIES

CORNERS, SMALL AREAS, GROOVES, FINE DETAILS

In the die shop of Admiral Die Castings, Chicago, (division of Portable Electric Tools, Inc.) and in scores of other die shops, the Di-Profiler has paid for its moderate cost many times over in man hours saved and in increased accuracy of castings.

For die making and die maintenance—for all draw filing operations, cavities, core pins and those hard-to-reach details—the Di-Profiler is indispensable.

The Di-Profiler is driven by a flexible shaft; it is light, sturdy, free from vibration. The reciprocating speed, controlled by foot rheostat, is variable from 0 to 100 strokes per second; the stroke length is adjustable from 0 to 1/4".

Di-Profiler accessories for every contour

... Diamond and Swiss files, flat and riffle; hones and T-C scrapers; also, for use with the Di-Profiler rotary hand piece: diamond wheels, points and T-C burrs.

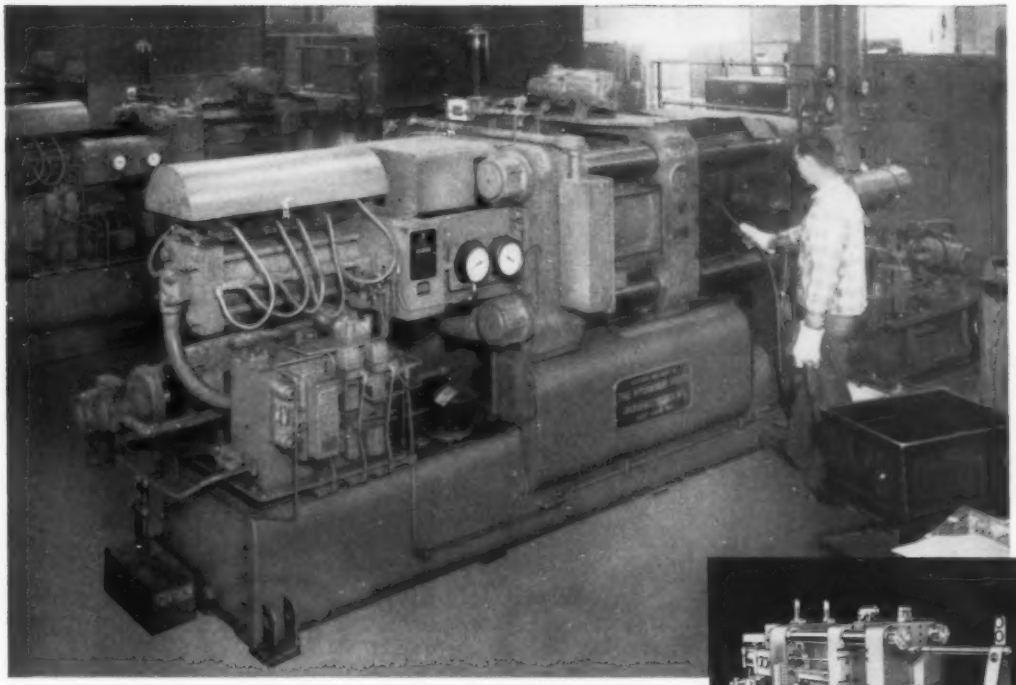
Ask for a free demonstration or illustrated Price List DV-98

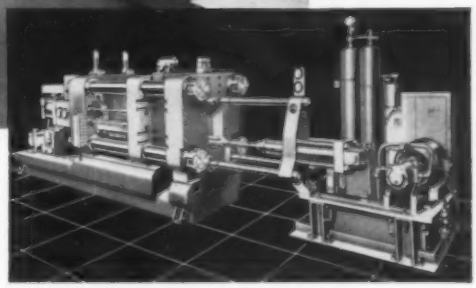
HYPREZ DIVISION
ENGIS EQUIPMENT COMPANY
431 SOUTH DEARBORN STREET, CHICAGO 5, ILLINOIS
Sole authorized distributor for the United States

Visit Space No. 724 A.S.T.E. Western Tool Show, Los Angeles

For more information circle No. 35 on the Reader Service Card

NOW MINNEAPOLIS-HONEYWELL
DIE CASTING WITH H-P-Ms





The Reason . . . Top Quality Parts are a MUST with This Company

With the installation of five H-P-M die casting machines in this company's new Golden Valley Plant, Minneapolis, the rigid requirements for die castings going into its finished products have been met. Confronted with the need for airtight and watertight castings to assure protection for their products in the field, high quality wall sections and surface finish are an absolute necessity. Yes, the new H-P-M approach in metal injection and the rigid clamp is doing the job.

Then, too, the rate of production with these machines has been high and rejects have been reduced to a minimum.

H-P-M die casting machines have a lot to offer for your production, too. Investigate thoroughly the advantages of these new machines. You won't have to pass up the tough jobs. Put them on an H-P-M . . . profitably! Call in a nearby H-P-M engineer or write for Bulletin 5700, today.

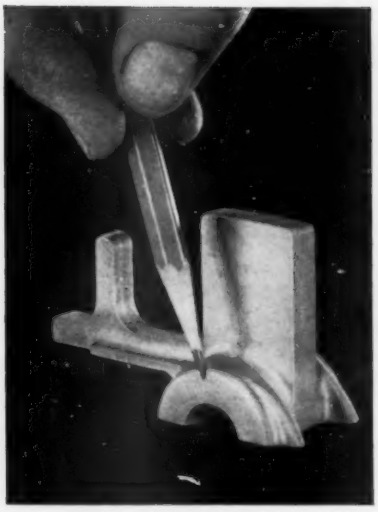
THE HYDRAULIC PRESS MFG. COMPANY
A DIVISION OF KOEHRING COMPANY • MOUNT GILEAD, OHIO, U. S. A.

HPM

H829

For more information circle No. 46 on the Reader Service Card

They're small . . .



They're intricate . . .

They're tight on tolerances . . .

They're subject to destructive service . . .

They're money-savers when they are Inco precision-cast!

In pairs, these tricky little parts form a carbon electrode holder for moving picture projectors.

The manufacturer specifies "D"* Nickel for the part. This metal provides high-strength and electrical conductivity . . . resists corrosion and spark erosion, even when temperatures climb to 750° F.

Looking for the most economical method of production, the manufacturer talked over precision investment casting with Inco. The part seemed a "natural": small . . . intricate . . . tight on tolerances.

They were right! Precision-cast by Inco, the part requires only *one* machining step . . . drilling a hole.

Here's how you can save: Whenever you have a high-melting-point metal part which is 6 inches x 5 inches or smaller, weighs under 3 lbs., required starting tolerances as close as plus or minus .005 inch per linear inch, and needs 5 or more fabrication steps, look into Inco precision casting. It often gives required precision with less machining.

Send us a sample or blueprint. Our Engineering Department will be glad to submit their recommendations and quotations on Inco precision investment castings.

*Registered trademark

5 Advantages of Inco Precision Castings

- **Save up to 60% of production costs.**
- **Longer life with harder alloys.**
- **Little or no machining required.**
- **Wider design latitude.**
- **Higher alloys at lower cost.**

Get This Helpful Booklet

Trying to keep costs in line on some small part? Then write for the 16-page booklet, "Cast to Outlast." Illustrated with case histories that may suggest a practical answer to your problem.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

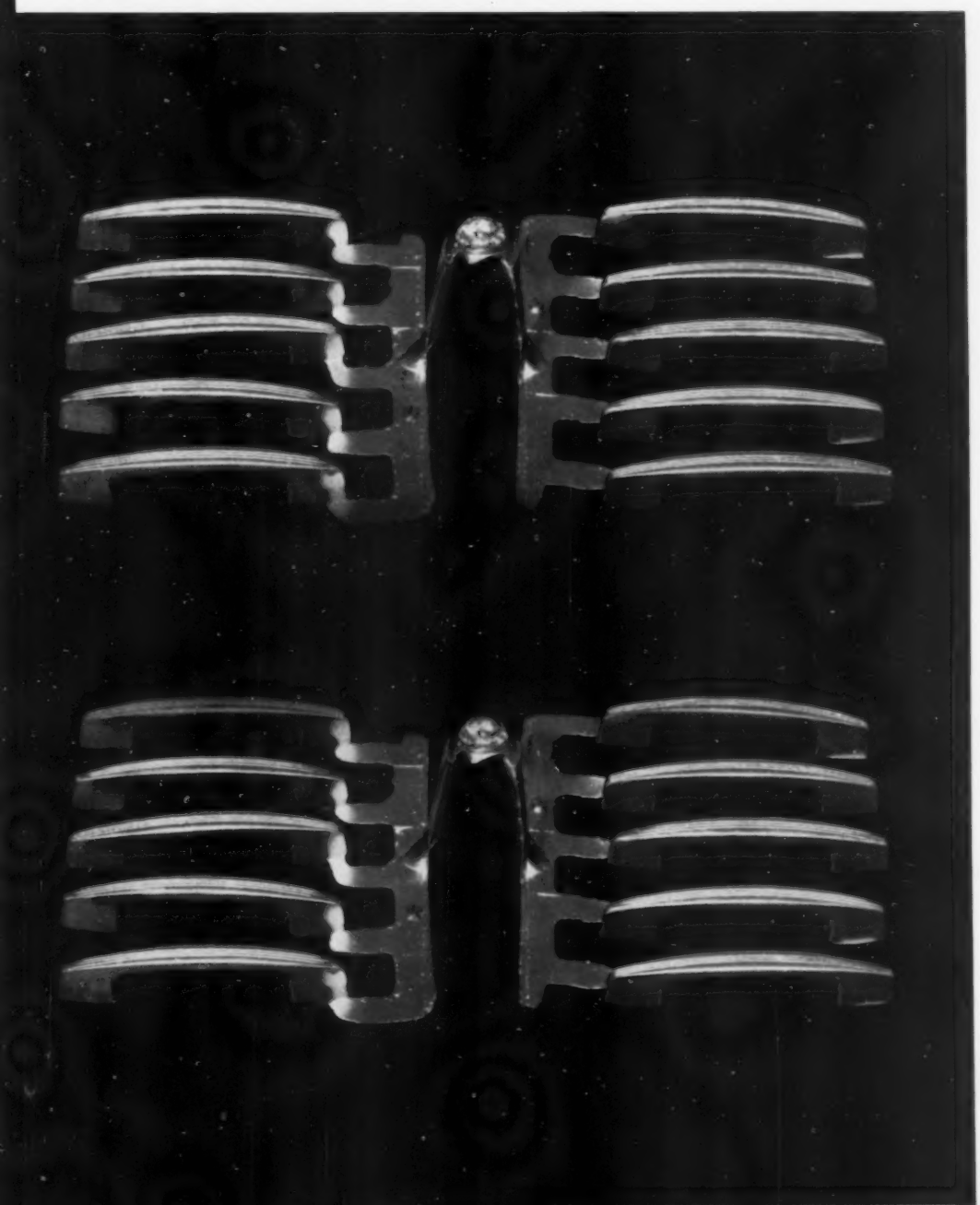
INCO TRADE MARK

Inco Castings . . . ***Precision, Sand, Centrifugal***

For more information circle No. 50 on the Reader Service Card

Completely controlled production provides you with die cast metals of highest purity and uniformity. Federated Di-Metal is made from special high grade zinc, electrolytically refined by Asarco-developed processes. Production is now concentrated "under one roof" at Corpus Christi, Texas, one of the world's largest plants producing special high grade zinc. Integrated production—controlled from mine to finished alloy—assures you of lower cost Zinc Di-Metal of the highest purity and uniformity. Federated can serve your Di-Metal needs through 22 sales offices throughout the country. There's one near you. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY

100 ton MIDGET . . .

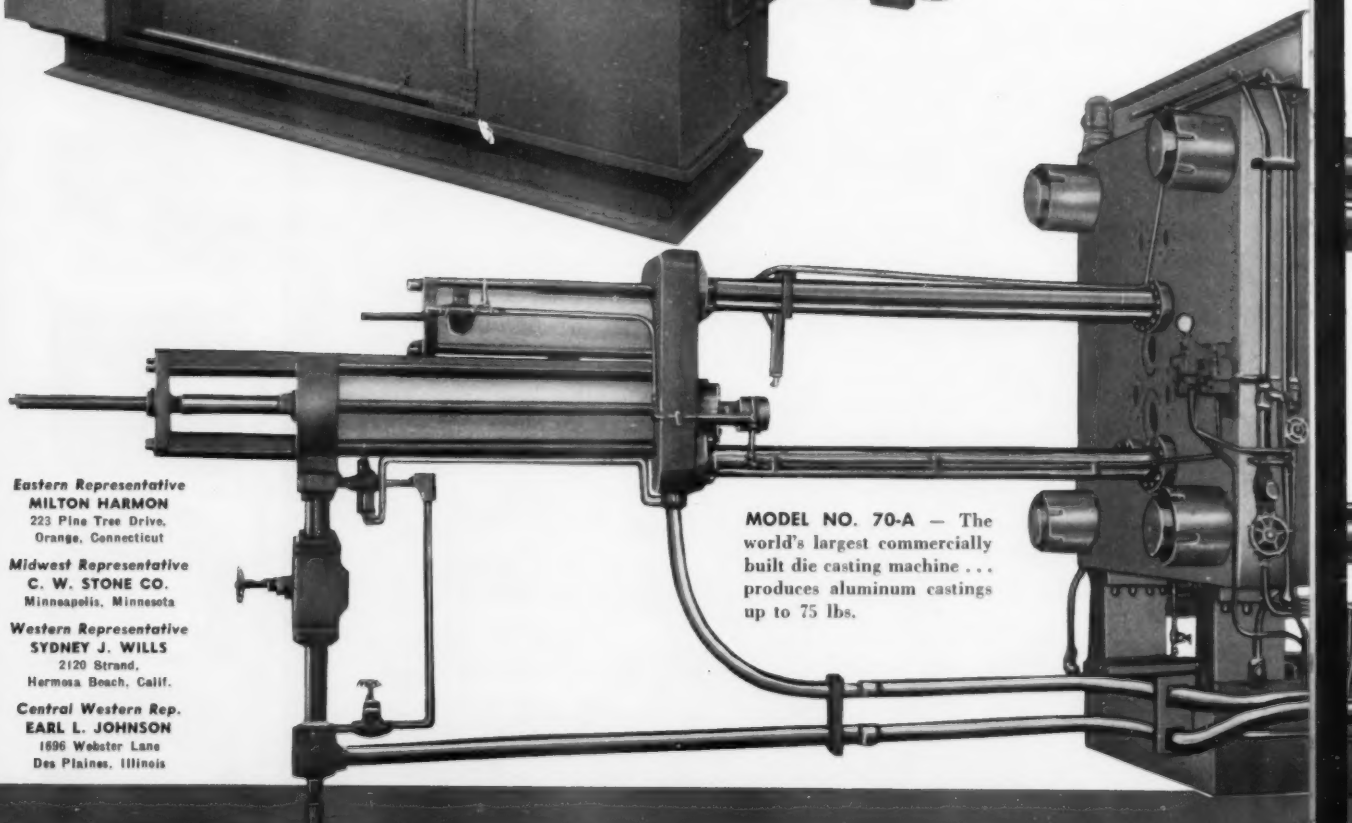
. . . there's a CAST-MASTER

OVER 20 STANDARD MODELS

INCLUDING ZINC, ALUMINUM

AND MAGNESIUM MACHINES

MODEL NO. 7-Z — For zinc, tin or lead. A natural for any die casting shop that specializes in small or medium size castings weighing up to 2½ pounds.



MODEL NO. 70-A — The world's largest commercially built die casting machine . . . produces aluminum castings up to 75 lbs.

Eastern Representative
MILTON HARMON
223 Pine Tree Drive,
Orange, Connecticut

Midwest Representative
C. W. STONE CO.
Minneapolis, Minnesota

Western Representative
SYDNEY J. WILLS
2120 Strand,
Hermosa Beach, Calif.

Central Western Rep.
EARL L. JOHNSON
1696 Webster Lane
Des Plaines, Illinois

CAST-MASTER *inc.*

1200 ton GIANT

to meet every production requirement!

Yes, large or small, there is a CAST-MASTER Die Casting Machine to meet every need. Over 20 standard models — from the smallest to the world's largest commercially built die casting machine. Featuring many exclusive engineering achievements that have proven themselves in years of actual service. For high speed production . . . for top performance in turning out uniform quality castings, you'll find CAST-MASTER sets the pace for the industry.

Design, Production and the Development of Dies

Cast-Master's new expanded operation now offers a complete package . . . jigs, fixtures, dies . . . designed and developed to meet every requirement. Whatever your problem our engineering department is equipped to tackle it. Phone, write or wire, without obligation.

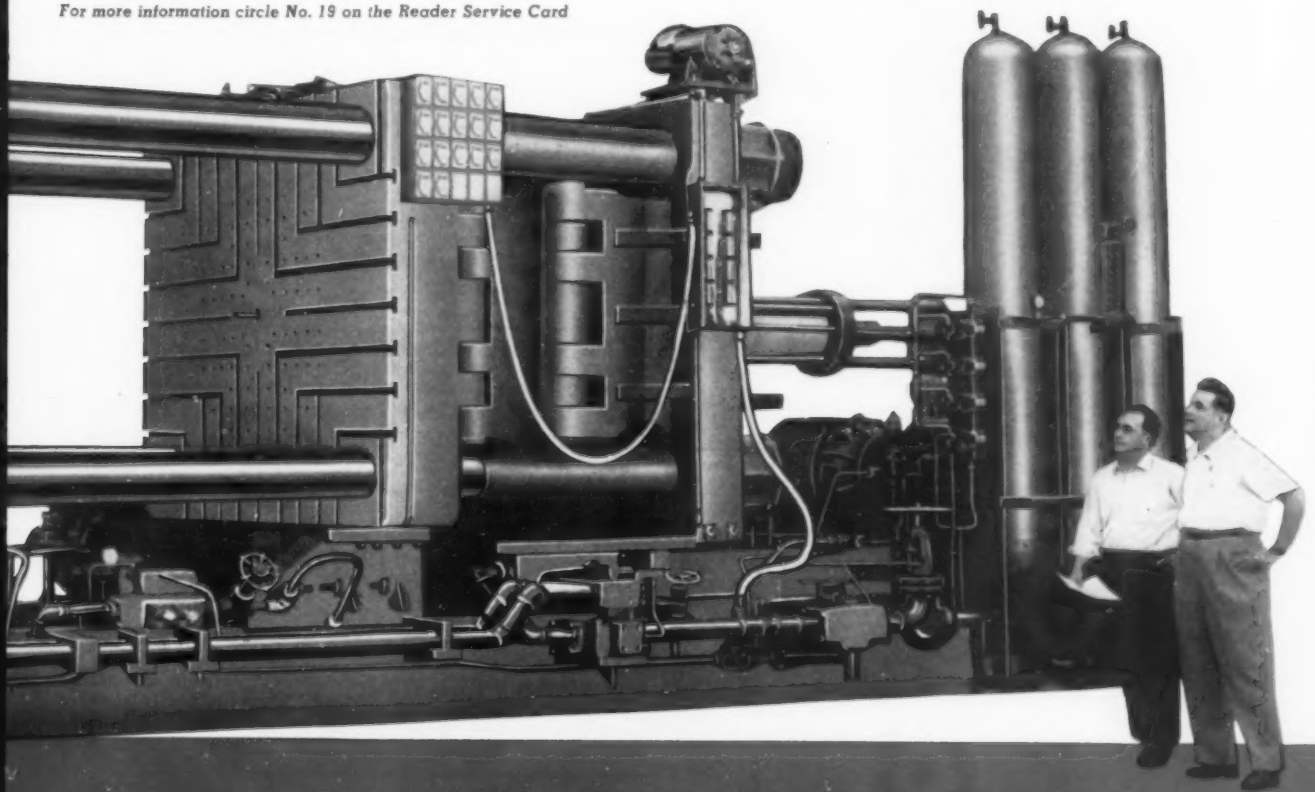
For more information circle No. 19 on the Reader Service Card

NEW! MULTIPLE CAVITY LOADER-UNLOADER

• *Loads Laminations* • *Die Casts*
• *Trims* • *Unloads 4 Rotors Automatically*

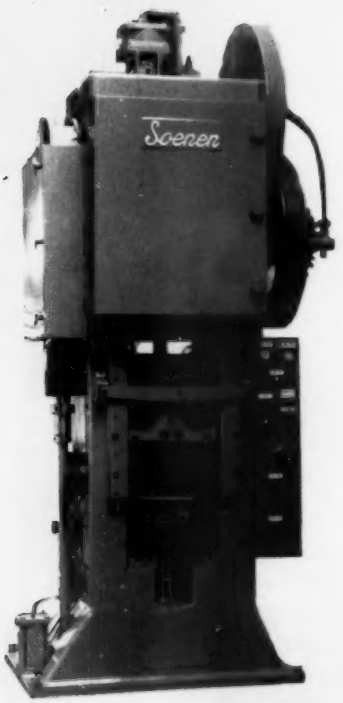
A major motor manufacturer gave Cast-Master the job of stepping up production and reducing labor on die-casting laminated rotors. Cast-Master solved the problem with a new automatic loader-unloader.

NEW DETAILED BROCHURE AVAILABLE



23901 Aurora Rd. • Bedford, Ohio

You are invited to a demonstration of a European



Compacting Press using "Withdrawal Tooling"

A. Johnson & Company, Inc. now represents two leading European press manufacturers producing this type of equipment:

SOENEN, Belgium	**SPIERTZ, France**
Mechanical (eccentric)	**Mechanical (toggle)**
6-220 tons cap.	**330-1,100 tons cap.**

These presses are ideally employed in industries such as metal powders, hard metals, ceramics, plastics, etc.

SEE THESE UNIQUE FEATURES:

1. Any number of movable lower punches.
2. Precise control of powder during compaction, assuring uniform density over all punches
3. Shorter punches, higher pressing pressures, less breakage.
4. Controlled stripping of die and punches from part, lower ejection pressure.
5. Simple rugged press design, lower initial cost, less maintenance, high speed.
6. Generous motor size with abundant flywheel energy.
7. Minimum flexure in rugged press frame producing closer part tolerances; especially suited for coining.
8. Tooling costs proven competitive with American designs due to interchangeability of punches and dies in our standard tool sets.

Assistance in tool design and layout offered. Let us quote on your close tolerance tooling. Inquiries solicited.

A. JOHNSON & CO., INC.
21 West St., New York 6, N. Y.

Yes, I would like to see a demonstration of Soenen presses and representative tools. Please send information about exhibition dates and technical data on the presses.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

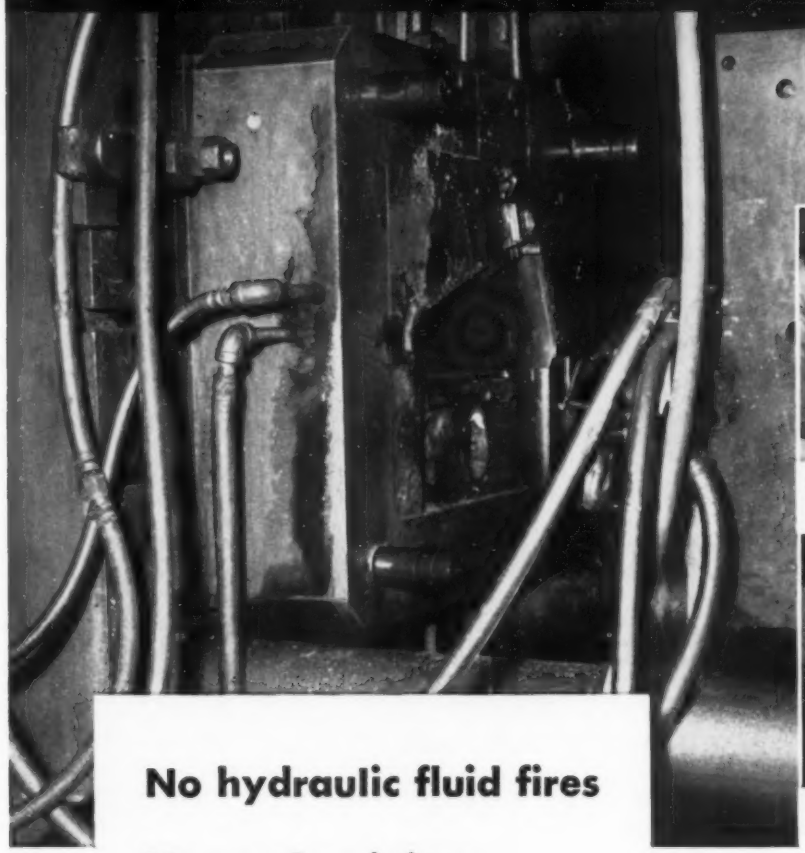
A. JOHNSON & COMPANY, INC.

MEMBER METAL POWDER mpi INDUSTRIES FEDERATION

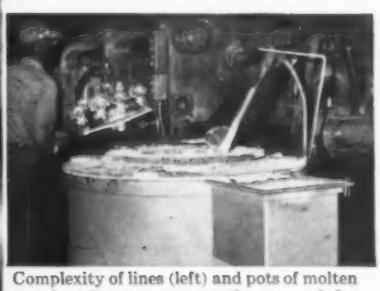
21 WEST STREET
NEW YORK 6, N. Y.

For more information circle No. 52 on the Reader Service Card

"For 3 solid years—



Irus Fluid's distinctive yellow color makes it easy to spot and trace leaks.



Complexity of lines (left) and pots of molten metals (above) represent the type of fire hazards requiring Shell Irus Fluid 902.

No hydraulic fluid fires

No worker injury

No equipment damage —since we switched over to

SHELL IRUS FLUID 902"

says Ernie Ike, Plant Superintendent
Western Die Casting Co., Emeryville, Calif.

According to Mr. Ike, these results are directly due to the switch-over in 1955 from conventional hydraulic fluids to Shell Irus Fluid 902.

Irus® Fluid 902 is a special combination of petroleum oils mixed with water and emulsifying agents. Its fire resistance is achieved through the relatively high water content. Irus snuffs out fire, *under plant conditions.*

Another important advantage of Irus Fluid 902 is its low cost. Plant operators now using Irus have discovered that Irus Fluid costs up to one-third less than other fire-resistant fluids . . . yet is comparable in performance in every practical respect.

If the hydraulic equipment in your plant is exposed to fire hazards, let a Shell Industrial Representative show you the advantages of Irus Fluid 902. Write Shell Oil Company, 50 West 50th St., New York 20, N. Y. or 100 Bush St., San Francisco 6, Calif.

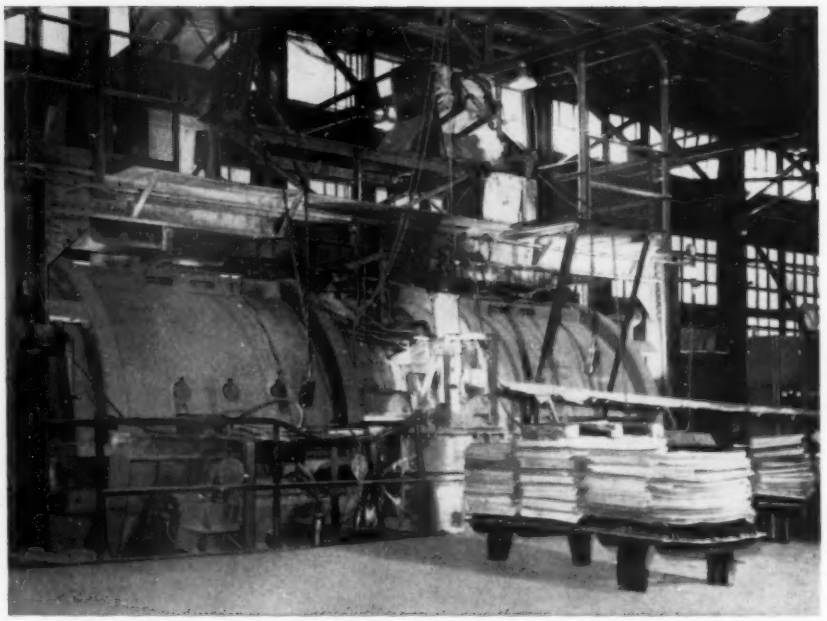
SHELL IRUS FLUID 902

a low-cost, fire-resistant hydraulic fluid

SHELL

For more information circle No. 75 on the Reader Service Card

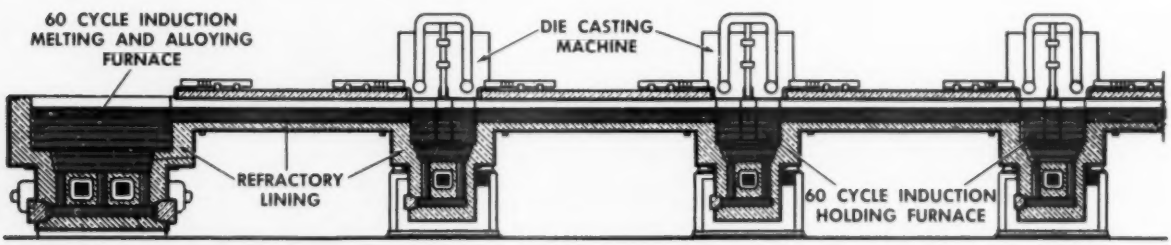
Birthplace of an Automotive Part



BUNKER HILL SPECIAL HIGH GRADE ZINC SLAB PRODUCED IN THE AJAX FURNACE

High in the mountains of Idaho, the AJAX-TAMA-WYATT 800 kw induction furnace melts 235 tons of electrolytic zinc cathodes day after day. THE BUNKER HILL COMPANY, originators of Special High Grade Zinc, take pride in the purity (99.99+% Zn) of the slab poured from this 60 CYCLE INDUCTION MELTING unit. Such pure metal insures the soundness of the many zinc die castings used in our cars and appliances.

To maintain this purity when remelting the slab for die casting, hundreds of AJAX-TAMA-WYATT furnaces are used today in our busy industrial regions. The diagram below shows a modern zinc die casting line for automotive parts, using a central 60 CYCLE INDUCTION MELTING and alloying furnace, and holding furnaces at each machine. Connecting electric molten metal runways eliminate all metal transfer labor. Unexcelled metal quality, low metal losses, reliability and economy of operation are assured by using 60 CYCLE INDUCTION MELTING throughout.


60 CYCLE INDUCTION MELTING AND ALLOYING FURNACE
DIE CASTING MACHINE
REFRACTORY LINING
60 CYCLE INDUCTION HOLDING FURNACE

AJAX USA

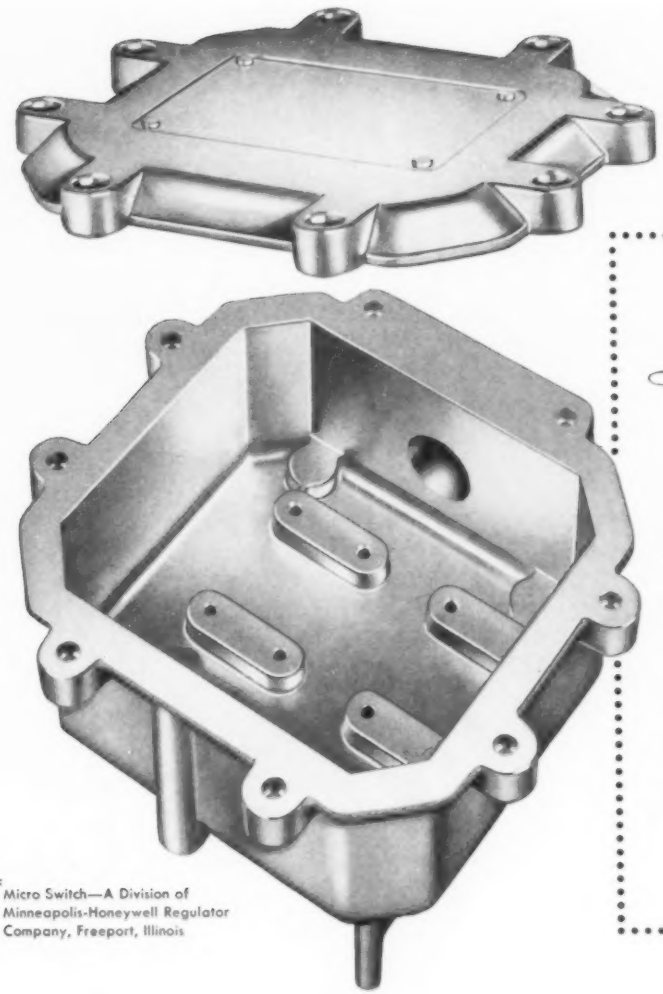
ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

60 CYCLE INDUCTION MELTING

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

For more information circle No. 4 on the Reader Service Card



*Micro Switch—A Division of Minneapolis-Honeywell Regulator Company, Freeport, Illinois

Lifetime Quality

with MADISON-KIPP zinc and aluminum die castings

The earmarks of lifetime quality are never elusive. They are there to see in dis-assembled, unpainted components. They are there to see in break-down tests.

The Kipp die cast body and cover of the *Micro Switch instrument here illustrated are of lifetime quality not only to encase and protect functional parts, but also to provide a rigid frame, ample bearing bosses, stable dimensions, and other last word engineering features.

The attentive mechanics at Madison-Kipp invite you to clip this ad as a reminder to contact them for close cooperation on the momentous details of design when you next have die casting requirements.

kipp

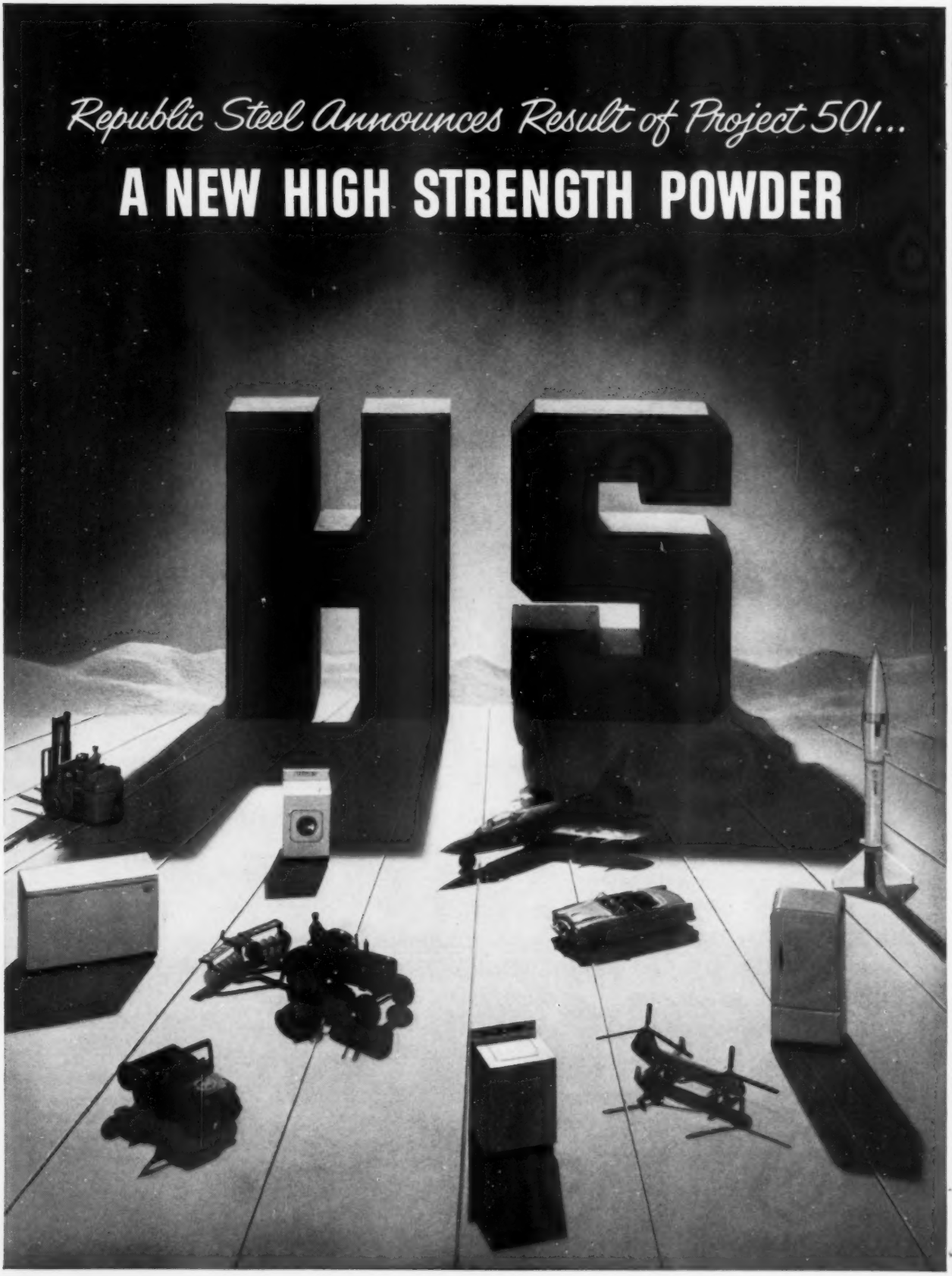
MADISON-KIPP CORPORATION
213 Waubesa Street • Madison 10, Wis., U. S. A.

Skilled in Die Casting Mechanics • Experienced in Lubrication Engineering • Originators of Really High Speed Air Tools

For more information circle No. 60 on the Reader Service Card

Republic Steel Announces Result of Project 501...

A NEW HIGH STRENGTH POWDER



Type 6460 Developed for Use in Higher Stressed Applications! Suited to Existing Operating Equipment! Provides High Strength with Lower Cost!

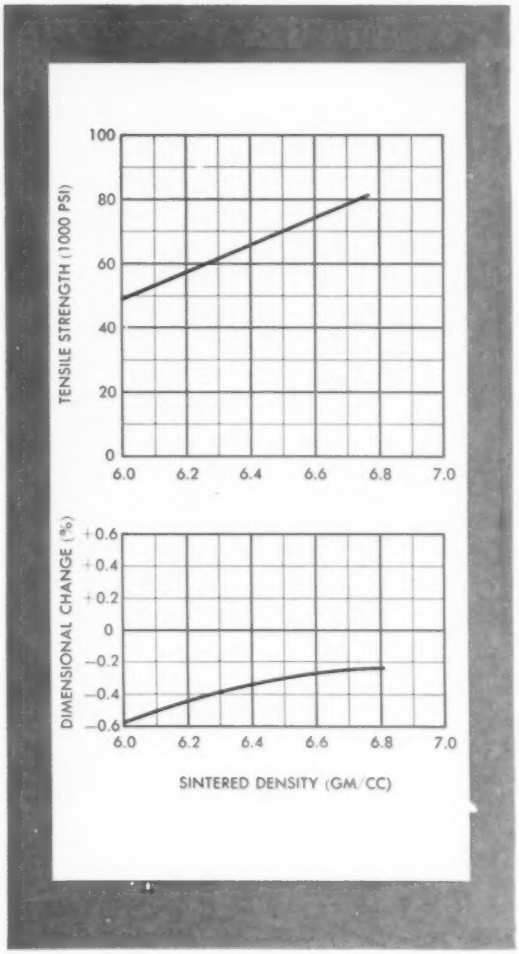
Again, the big news in the powder metallurgy industry comes from Republic Steel. First, Republic gave the industry powders with controlled dimensions. Now, at its Toledo, Ohio plant, Republic has developed, tested, and is *producing* a new **H**igh **S**trength Powder which permits the use of sinterings for highly stressed parts.

This new powder, designated Republic Type 6460, provides these advantages and features:

- Minimum tensile strengths at 6.4 density of 60,000 p.s.i. as sintered, and 100,000 p.s.i. heat treated, as determined on Standard MPA Test Bar.
- *Can be used with existing operating equipment.*
- Normal briquetting pressures—30 to 35 tons to obtain a density of 6.4 grams/cc.
- Normal sintering cycles—2030°F. to 2050°F.—45 minutes—Endo Atmosphere.
- Normal heat treat procedures—additional information to obtain higher physical properties available upon request.
- Dimensional characteristics after sintering acceptable by commercial practices indicated by the industry—less than .004 inches per inch shrinkage from die size at 6.4 density.
- Available in *production quantities* up to and including 12 tons, or in multiples thereof.

Republic Type 6460 Powder represents an entirely new, but thoroughly practical material for the powder metallurgy industry. It opens the way to new markets for new applications of **H**igher **S**tressed parts at lower costs.

Our metallurgists and engineers are ready to help you utilize all the advantages of Republic Type 6460 Powder. Just mail the coupon to obtain their services, or for technical data sheet on Type 6460 Powder.



REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. PM-5430
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a metallurgist call.

☐ Send more information on Republic Type 6460 Powder.

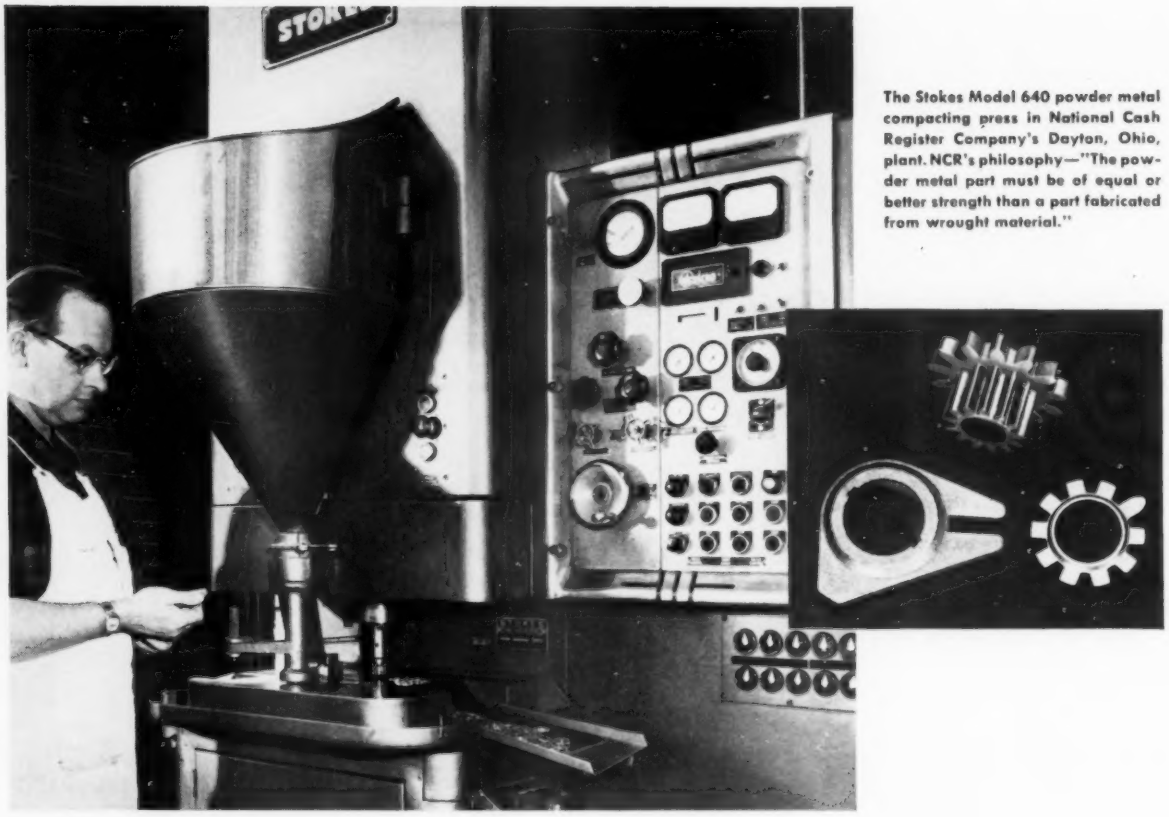
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

For more information circle No. 73 on the Reader Service Card



The Stokes Model 640 powder metal compacting press in National Cash Register Company's Dayton, Ohio, plant. NCR's philosophy—"The powder metal part must be of equal or better strength than a part fabricated from wrought material."

National Cash Register rings up savings through powder metallurgy...

The Stokes Model 640 50-ton powder metal press, at the Dayton, Ohio, plant of National Cash Register Company, has proved a valuable tool in the production of precision gears and parts for cash registers and accounting machines. In 1957, over 250 different high-density parts were made by powder metallurgy—in early '58, 47 additional parts went into production.

The economic benefits of this process have also been proved. A cost analysis of 54 parts shows substantial savings per year through lower direct labor costs in machining and inspection. More complex parts are continually being introduced—parts with hubs, steps, and thin projections—made possible by press equipment such as the Stokes 640.

The Stokes Model 640 offers up to five press motions with independently adjustable compression, fill and ejection points . . . each with direct reading position indicators calibrated to .001". This set-up versatility is teamed with operating simplicity that enables economical long or short runs, and permits easy re-runs of jobs on which set-up standards have been established.

Investigate the proved potential of powder metal pressing . . . not only for ways to cut costs and save metal over conventional machining, but also for ways to get properties of metals, alloys and mixtures not attainable by other techniques. Ask for a production and economic analysis on your own parts. Stokes' facilities include sample production, punch and die design and fabrication, and operator instruction. Stokes Engineering Advisory Service is ready to serve your powder metallurgy needs, whether large or small.

Powder Metal Press Division
F. J. STOKES CORPORATION
5500 Tabor Road, Philadelphia 20, Pa.

STOKES

For more information circle No. 77 on the Reader Service Card

BETWEEN THE LINES

continued from page 4

BEGINNING IN THE OCTOBER ISSUE you'll find editorial material on a, for us, brand new subject—Extrusions, the extrusion process and equipment and supplies for the extrusion industry. One of the fastest growing fields in metal forming, the extrusion industry nicely compliments the other precision processes covered editorially by PRECISION METAL MOLDING.

Before we decided to add this new field, we went out and asked a majority of our readers two questions. Do they want editorial coverage in PMM on extrusion and where do they now get the information they need? The replies were overwhelming in favor of including this hot subject in the magazine and a very large majority told us that they depend on hand-out literature from the various companies in the field for technical information.

So you can look for articles like these in the coming months:

What Is The Extrusion Process
The Properties of Extruded Metals
Die Steels For Extrusion Dies
Finishing Extrusions
Continuous Casting of Extrusion Billets
Impact Extrusion of Heavy Sections
Extrusion of Steel Shapes
Dimensions, Tolerances and Finishes for Extrusions.

These are just a few of the topics that will be covered. In addition there will be plenty of case histories that tell, and show, how extruded shapes are now being used.

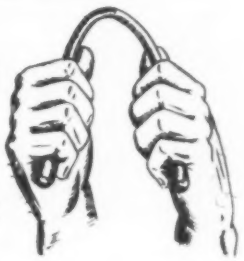
And don't forget, if there's any particular phase of the subject, or for that matter in any of our editorial fields, that you want to see an article on, let us know. We'll find the man best qualified to write the article and get it for you.

POWDER METALLURGY'S newest product is a sintered material that's a mixture of metal powder and abrasive. It has been used successfully as a barrel finishing media by Bendix Aviation Corp. in the finishing of delicate parts. Its prime advantages are speed of cutting and ease of removing lodged particles. For a full report on this material turn to page 74.

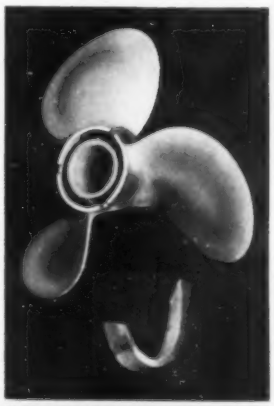
For "Specials"

LITEMETAL Die Castings of

Meet Needs where *Toughness*—



with Strength and Shock Resistance is Essential



Perhaps you have a product or part that requires special techniques or alloys to make it competitive and consumer acceptable. If so, a consultation—*now* with LITEMETAL may be your solution. It requires special melting and casting procedures to realize the full potentials of ALMAG 35. The specialists at LITEMETAL know these techniques and apply them successfully. Die Castings of ALMAG 35 also offer these bonus features: Corrosion resistance • take high polish (white color) • dimensional stability (no heat treat required).

Although ALMAG 35 is more expensive than ordinary aluminum alloys, its cost is more than offset through its successful die casting by LITEMETAL into many products that primarily require toughness. At the same time, it offers the economies inherent in the die cast method, such as, the virtual elimination of machining otherwise required for finishing. The photos here are of two of the products die cast by LITEMETAL from ALMAG 35. With the propeller is shown a blade section that has been bent to U shape without fracture. Shown behind the ladder lock is one that has had the bottom section bent practically 100 degrees. This toughness afforded by ALMAG 35 is combined with its ability to withstand hard and sharp blows without fracture. The chart below defines these features:

Write today for literature and design information. Quick action on inquiries.

ALMAG 35 Mechanical Properties

Tensile Strength	44,000 psi*
Tensile Yield Strength	24,000 psi*
Tensile Elongation	11%*
Sheer Strength	28,000 psi
Endurance Limit	23,000 psi

*ASTM Test Bar

LITEMETAL DICAST, Inc.
A SUBSIDIARY OF HAYES INDUSTRIES
1925 WILDWOOD AVE. • JACKSON, MICHIGAN
PLANT AND EXECUTIVE OFFICES

For more information circle No. 57 on the Reader Service Card

Why You'll Like Cromo-High V For Long Production Runs

When die-casting zinc, aluminum or magnesium, you can count on long production runs from dies made of Cromo-High V—Bethlehem's 5 pct chrome-moly tool steel, with 1 pct vanadium.

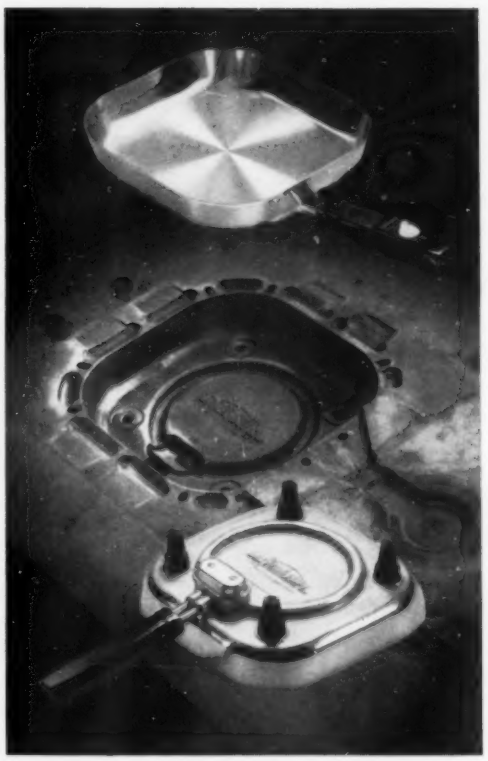
Engineered for long service, Cromo-High V has extra toughness, and resists both wash and erosion. Cromo-High V is made by a controlled melting procedure. Uniformly annealed, it's easy to machine. It also has good center density and grain refinement, and is free from porosity.

Cromo-High V is ultrasonic-tested for quality. It responds uniformly to heat-treatment. You can also count on uniform heat-treatment in massive sections to a hardness of Rockwell C45-47.

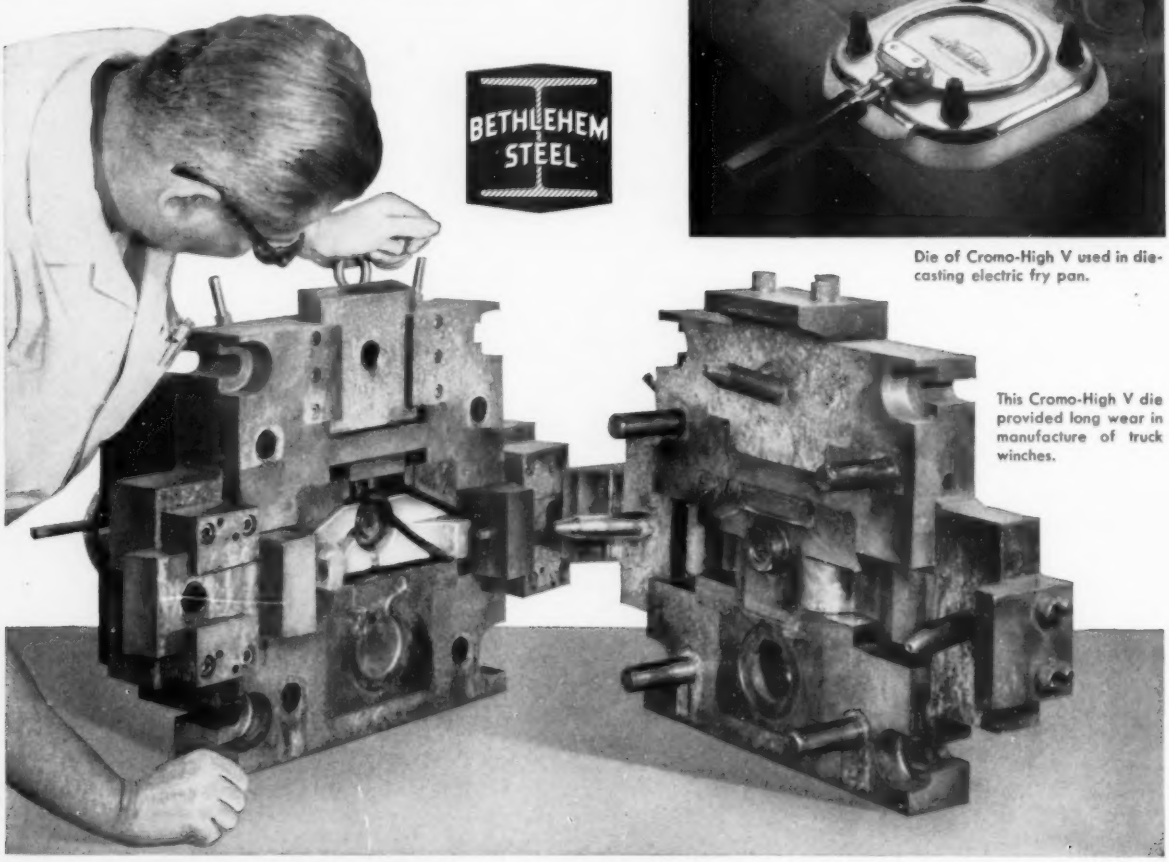
It all adds up to a top-choice steel for those long runs. Plan now to give Cromo-High V a workout. Your Bethlehem tool steel distributor has this fine grade in stock, and will be pleased to work closely with you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor, Bethlehem Steel Export Corporation



Die of Cromo-High V used in die-casting electric fry pan.



This Cromo-High V die provided long wear in manufacture of truck winches.

BETHLEHEM TOOL STEELS

For more information circle No. 14 on the Reader Service Card

WHO BUYS DIE CASTINGS?

These Industries Do!

Last year, die casting accounted for the largest single use of zinc – displacing galvanizing for the first time in history as the metal's major consumer.

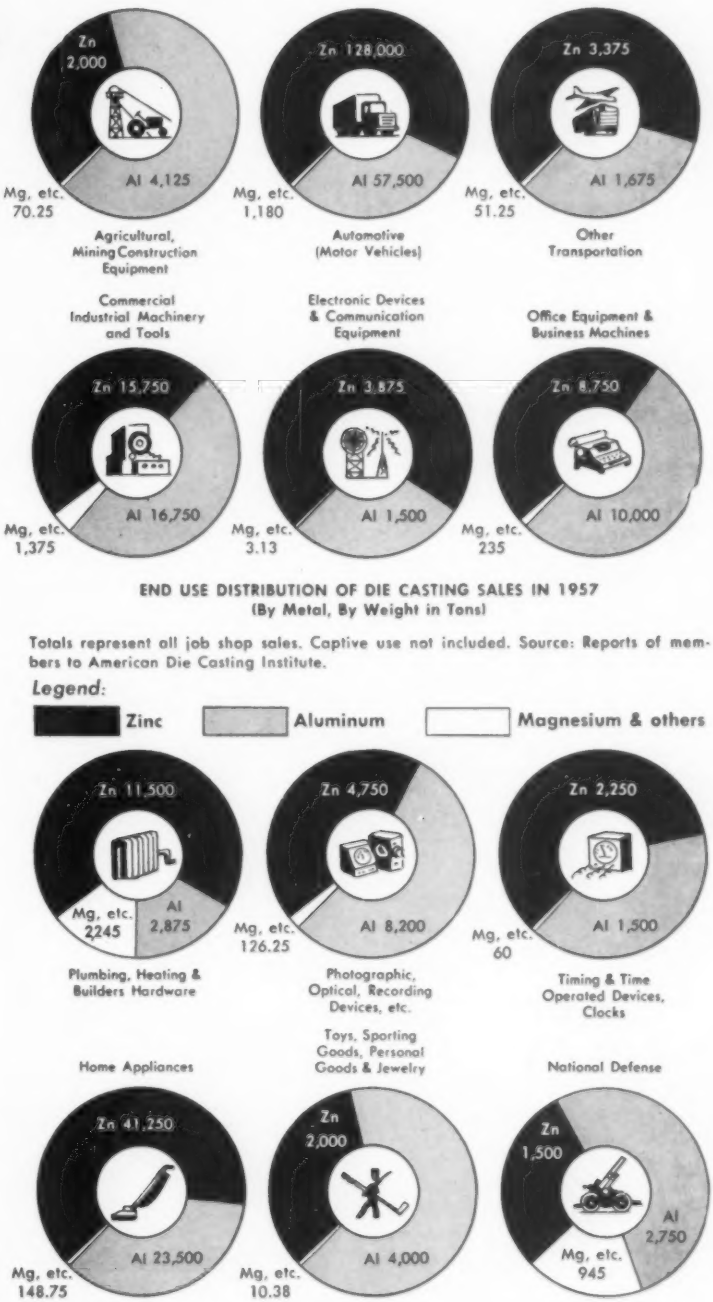
Consumption of zinc for die casting in 1957 is estimated at 370,177 tons. This amounts to 40% of all slab zinc consumed last year. Shipments of zinc die castings by job shop, or custom producers represented some 61% of the zinc die casting metal consumption totals. The balance represents captive production by end product manufacturers.

Prior to 1928, the year Bunker Hill pioneered the production of "four-nines" metal, die casters would never have dreamed that their zinc-base products would become a vital factor in modern engineering processing. Least of all could they have foreseen that in a relatively short span of years their infant industry would outrank the galvanizing industry as the nation's largest consumer of zinc.

DIE CASTING
is the Process

ZINC,
the Metal

BUNKER HILL,
THE PREFERRED ZINC



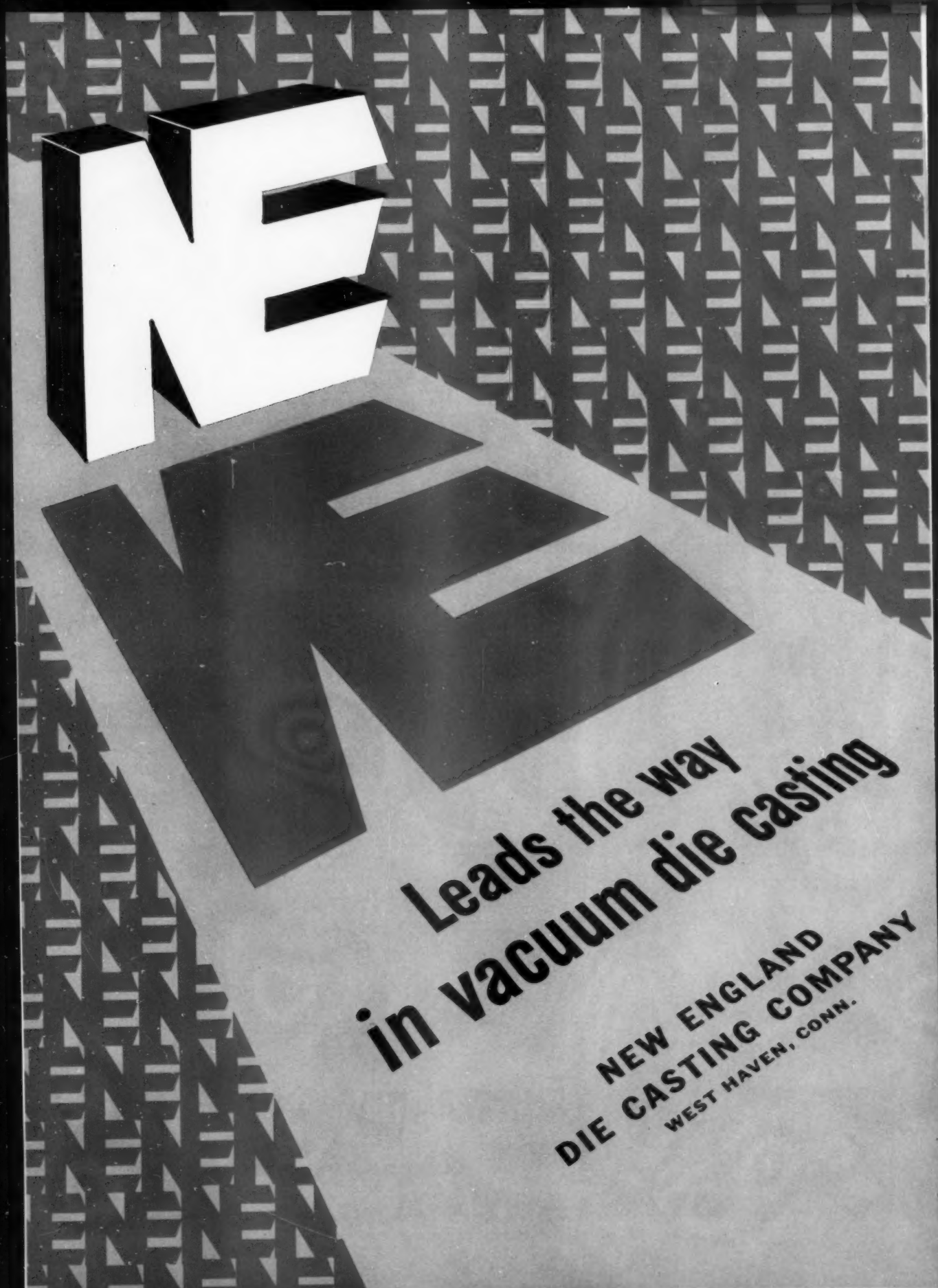
END USE DISTRIBUTION OF DIE CASTING SALES IN 1957
(By Metal, By Weight in Tons)

Totals represent all job shop sales. Captive use not included. Source: Reports of members to American Die Casting Institute.

BUNKER HILL 99.99+% ZINC

EASTERN SALES AGENTS
ST. JOSEPH LEAD COMPANY, 250 PARK AVENUE, NEW YORK 17

SALES OFFICE FOR PACIFIC COAST
THE BUNKER HILL CO., 660 MARKET ST., SAN FRANCISCO, CALIF.


NE
NE
Leads the way
in vacuum die casting
NEW ENGLAND
DIE CASTING COMPANY
WEST HAVEN, CONN.

DIE CASTING FORECAST

A reliable yard stick indicates that . . .

In 1959, Die Casting Shops Will Be . . . Busy!

YOU may not see it yet, but the recession *hit bottom* in late July or early August. Die casting activity will start to pick up about October and will continue on a slight upward trend for the balance of this year and into 1959.

How do we know?

The tool and die shops who customarily make tooling for the die casting industry are getting busy. They're making die casting dies and at what these tools cost, they aren't going to lay around idle. They're being made to go into production – and that means in from two to six months. While the level of activity in the tool and die shops is not quite as high as in previous years, there is a substantial increase in business, particularly for those shops that have customers in the die casting industry.

Our field men began to get an intimation of this trend several months ago.

To confirm, or refute, this apparent trend we questioned *all* of the members of the National Tool & Die Manufacturers Association who said that they could and would build tooling for any of the PMM industries. There are 219 of these shops in this country. Of these 219 shops an even 100 or 45.7% sent in usable replies.

Here's what we asked and what they said.

1. Are you now making any die casting dies?

47% said "Yes".

2. In what general industry classes will the castings made from these dies be used?

Automotive	59.6%
Home appliance	63.8
Consumer goods	53.2
Industrial goods	57.2

3. At what level (%) of capacity is your shop now working?

under 50	10.6% of the replies
50	12.8
60	8.5
70	8.5
80	17.2
90	15.6
100	21.9
over 100	4.7

Figures in question 2 add up to over 100% since many of the shops are making dies at present for more than one industry class.

This is added evidence of the dynamic upsurge which is taking shape in America's die casting shops.

Another indication: Probably many products that have previously been fabricated by machining, stamping or some other process will be converted to die castings. Or, new products and new designs that have been developed are to be made as die castings rather than by some other method.

This shows up in the fact that 38% of the shops have no die casting die work and 62% have, and all of these shops are set up to do all types of tool and die work.

This indicated trend toward die castings coupled with the moderately high level of activity (over 50% of the shops are working at or above 80% of capacity) seems to indicate that die casting operations should show an upward trend.

Remember, die casting tools are made and put into use – they don't stand around on a shelf.

DIE CASTING FORECAST

Steadily increasing labor costs and skyrocketing machine tool prices mean that . . .

The Use Of Die Castings Will Grow in 1959

TEN-YEAR FIGURES

Year	Average Hourly Wage All Mfg. $	Average Cost Of Machine Tools (Metal Cutting Only) $	Sale Of Die Castings Millions Of $
1949	1.37	7,222	308.5
1950	1.42	7,363	468.6
1951	1.53	8,930	403.3
1952	1.61	11,630	399.0
1953	1.71	13,019	533.3
1954	1.76	15,251	463.7
1955	1.82	13,275	825.2
1956	1.91	13,858	740.6
1957	2.01	15,726	731.7
1958	2.06*		

*Estimated

WHY is the use of die cast components steadily growing? There are many reasons, but nearly all of them add up to basic economics. They're less costly when finished.

Over the past ten years, labor costs have risen from $1.37 per hour to an estimated $2.06 per hour for this year(1). Along with this rise in wages there has been a decrease in basic productivity per man. A man doing the same work, with the same tools, will not produce as much today as a man produced ten years ago.

To just maintain productivity machines have had to take over some of the work formerly done by hand. Then, to compensate for the increase in wages, still more man-power had to be replaced by machines.

Naturally this increased complexity and versatility that has been built into machine tools has increased the average cost of metal cutting and shaping units. This increase has been more than two fold in the same ten year period(2).

continued on page 58

DIE CASTING FORECAST

Market trends are seen in this detailed...

USE OF DIE CASTINGS IN 1957 BY INDUSTRIES				
Industry Groups	**Zinc % of Total**	**Aluminum % of Total**	**Magnesium % of Total**	**Brass % of Total**
Agricultural, Mining Construction Equipment	0.9	3.1	0.1	1.8
Automotive	56.9	42.8	37.4	4.8
Other transportation	1.5	1.2	1.2	0.5
Machinery & Tools	7.0	12.5	32.3	13.4
Communications Equipment	1.7	1.1	0.1	
Business Machines & Office Equipment	3.9	7.5	7.7	0.6
Plumbing, Heating & Builders Hardware	5.1	2.1		59.8
Photographic & Optical Devices	2.1	6.1	3.9	0.5
Clocks & Timing Devices	1.0	1.1		1.6
Home Appliances	18.3	17.5	4.1	1.0
Toys, Sporting Goods, etc.	0.9	3.0	0.1	0.2
National Defense	0.7	2.0	13.1	15.8
Totals	100.0	100.0	100.0	100.0

Source: AMERICAN DIE CASTING INSTITUTE

Survey of Die Casting Uses Outlined..Industry by Industry

THE custom, or jobbing, die casting industry accounts for a good majority of the metal cast. In 1957, for example, 71% of the aluminum, 64% of the zinc, 89% of the magnesium and 71% of the brass were cast by custom shops (1).

With the automobile industry still the largest single customer for die castings it is not at all surprising that the poor public reception of the 1958 models created a severe recession in the industry.

It would seem, then, that broader diversification by the custom die caster would be the answer to any future sharp breaks that might be brought on by poor business in any single industry.

That the die casting industry is aware of this has been shown by the almost uniform division of tooling jobs that are now being made (see page 41). But the problem which remains is: In which industry groups should the custom die caster hunt his new customers?

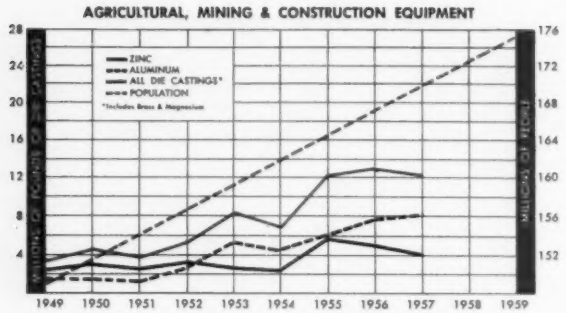
The table shown above together with the following charts will help to define the most promising fields. Naturally a common denominator must be used to evaluate industry growth and potential. The most reasonable one is population growth. Any healthy industry should have a growth rate at least equal to the rate of population increase.[1]

We can, therefore, assume that all of the industry groups, except national defense, have shown this minimum rate of growth. For the custom die caster, then, the industries in which he might seek for the most active markets are those where the use of die castings is at a lower rate than the rate of population growth.

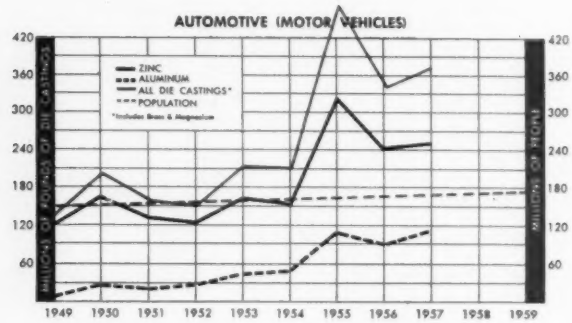
Whenever possible the comments about probable use of die castings next year are by industry spokesmen or by an accepted authority in the industry.

In a few cases no opinion could be secured and the comments are the editors' opinions based on interviews with members of the industry.

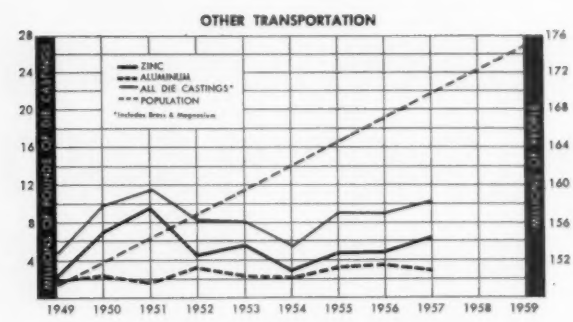
1. Sources: Consumption of die castings, American Die Casting Institute, Inc. Population figures, U. S. Dept. of Commerce.



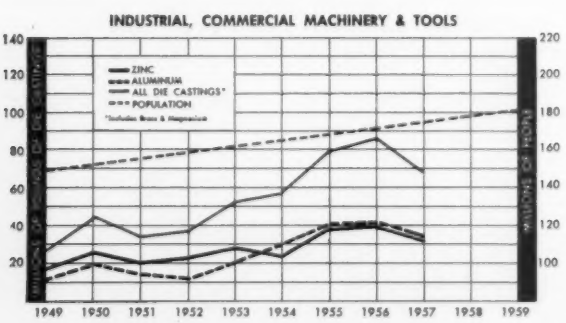
While farm and construction equipment represents a small share of the total market, it is capable of considerable growth. Fred S. Slick of the J. I. Case Co. says: "It is my contention there is a place and a very good future in our industry for die castings. As our engineers become more acquainted with die castings they are taking advantage of the precision that is common. This induces quite a saving in complicated castings that are difficult to machine. The use of die castings in the agricultural industry will inevitably increase as we gain experience in proper design."



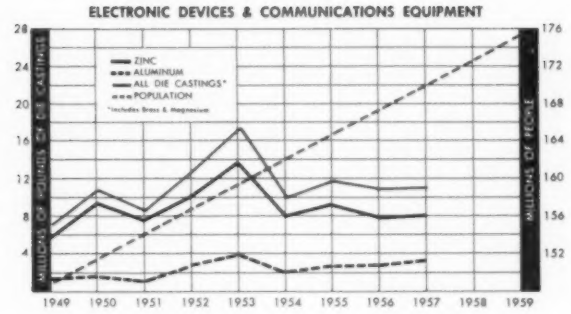
The automobile industry will continue to be the best single customer for die castings. While the production of cars will probably be below the record years, there are some indications that the use of die castings per car will increase. Forest R. McFarland, of Buick, reports that "usage of die castings will increase, with alumium probably the most popular." If this trend carries through to most other cars it should help to compensate for the expected lower unit production. The increased emphasis on inplant operations in this industry will leave a permanent gap which must be filled by other industries.



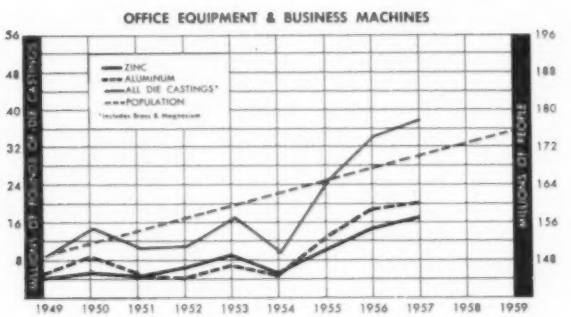
The general transportation industry, as distinguished from automobiles has been in bad shape for several years. The losses that die casting have suffered have been due to the number of duplicate units decreasing below the point where die casting is economical. This downward trend is emphasized by a spokesman for North American Aviation, Inc., who said: "A survey of our various divisions with respect to future use of die castings of all types indicates that purchases will probably be lower." Increased use of die castings in this industry will probably have to wait for lower tooling costs and possibly higher-strength castings.



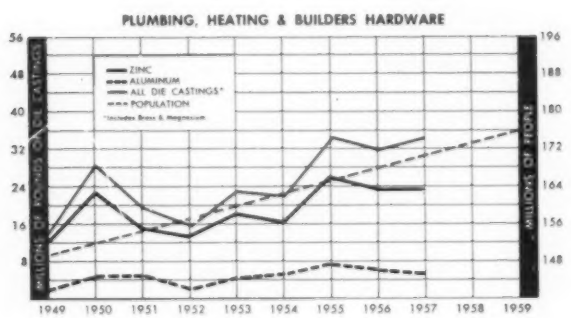
The machine tool industry represents the third largest consumer of zinc, aluminum and brass die castings, and the second largest consumer of magnesium die castings. While this industry has had a healthy use of die cast parts over the past ten years there is room for appreciable gains. Most manufacturers of these tools, especially in the heavy classes, are wedded to cast iron components. Many of these can, and should, be replaced by die castings. Such a conversion would improve the tools and lower manufacturing costs. Quantities, of course, would have to be large enough to pay off tooling.



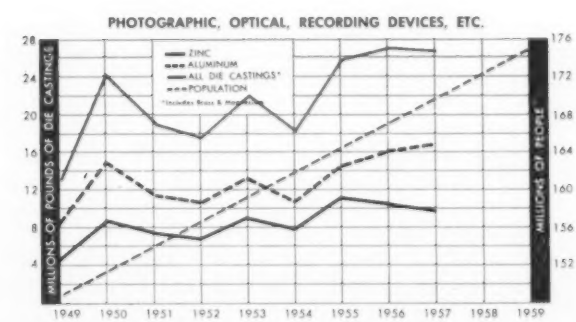
The communications industry has slipped from a high in 1953 when it consumed nearly 4% of the zinc cast, and over 2% of the aluminum die cast, to its present rather low position. Much of the loss has been to plastics. Some industry leaders have said that the wider range of permanent colors and the thinner walls that can be molded have been the principle reasons for the shift away from die castings. This is one industry where aggressive selling by the die casting industry will be required if the market is to be recaptured. Based on population growth, die casting use in communications is not in good health.



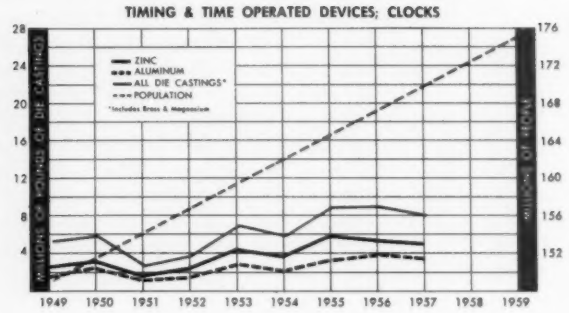
The rate of consumption of die castings in the business machine field has almost paralleled the growth in population. This would indicate that a sufficient selling job has not been done. However, Wayne Watson of International Business Machines Corp. reports, ". . . we expect to use an increasing number of die castings in the ensuing year. The majority of such castings will be fairly evenly divided between aluminum and zinc. We have very few, if any, applications in magnesium and brass." Other companies feel about the same and the general feeling is that the use of die cast parts will be greater than any upturn in business.



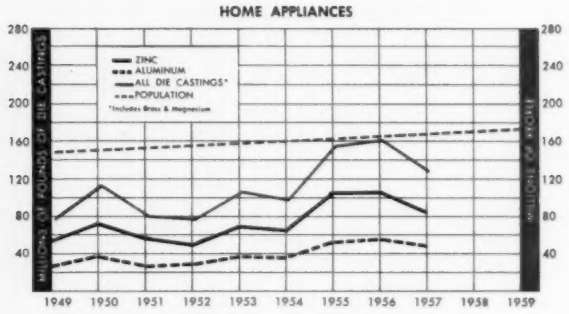
One of the bright spots in the die casting picture is the plumbing, heating, and builders' hardware industry. Always a major consumer of die cast parts, they should make the coming year even better than in the past. Mr. Thomas P. McFarlane, of American Hardware Corp. says: "A survey of the activity of the several divisions of this company indicates that next year will show an increased use of die castings over the current year. It is estimated that several million pounds of die castings will be used. These will be divided about 95% in zinc and 5% in aluminum. Low machining costs and ease of finishing are the principle reasons for their use."



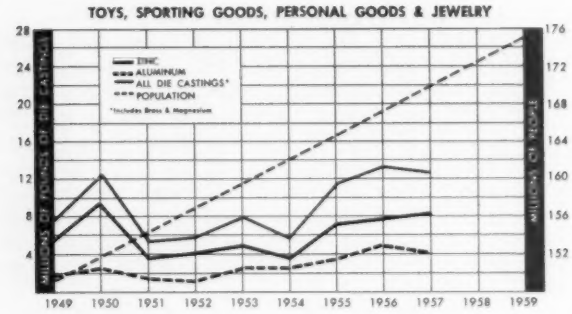
Photographic and optical devices have shown both a healthy growth and an increasing use of die castings. N. L. Symons, speaking for Argus Cameras only reported; "Our usage of die castings in 1959 is expected to increase over 1958. This will be due primarily to our entry into the 8mm movie field. Although I cannot speak for the industry, I think it is a safe assumption to say that the photographic industry is growing very rapidly and as a result the use of aluminum and zinc die castings in the industry should increase, at least in proportion to the general industry growth."



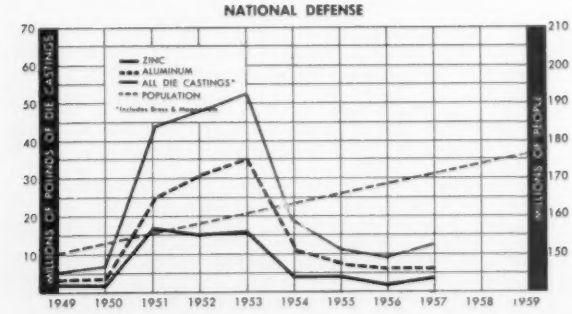
The use of die castings in the clock and timing industry has been almost static for the past several years. While only a small consumer of materials at best, there is ample evidence that the die casters have not done a good selling job here. I. A. Terry of the Clock Timer Dept., General Electric Co., reported: "We use zinc die castings for some of our clock and timer parts. Cost comparisons and life tests have shown that on simply shaped parts we can make them cheaper by conventional machining. Life is adequate in both cases. Die castings show a real saving only on complex shapes." Work is needed here.



Properly, the appliance industry should be divided into two classes; major home appliances and small home appliances. In the major appliance field there is so close an approach to market saturation that any growth beyond normal obsoletion and population growth can not be expected. This will limit production to quantities that may be below economic die casting production. A spokesman for the Westinghouse major appliances said: ". . . the only general thing that could be said about our use of die castings is that we probably are not increasing our use." Small appliances will probably take increasing numbers of die castings.



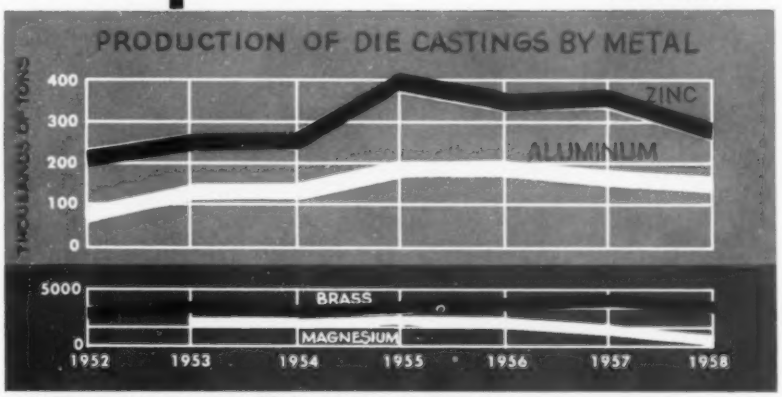
In this highly competitive industry, cost differences of a fraction of a cent can swing production from die castings to a competitive material and method. It is probably an outstanding example of an industry group where some of the newer developments such as vacuum die casting, lower cost finishing, and good color anodizing can recapture the market for die castings. There are already, some indications that some of this market will be recaptured in the coming year. Public reluctance to buy products that fail quickly due to inferior materials is beginning to be felt.



Quite naturally the use of die castings in National Defense items is closely tied in with world tensions. Fortunately, the use of die castings in defense are now at a low ebb. It is probable that there will be no particular increase in this use unless there should be another major war. Even in this event, the growing use of expendable equipment may very well preclude the use of die cast parts due to the need for components with high strengths at elevated temperatures. Service life of the parts is becoming unimportant. Loss of business in this field should not be deplored.

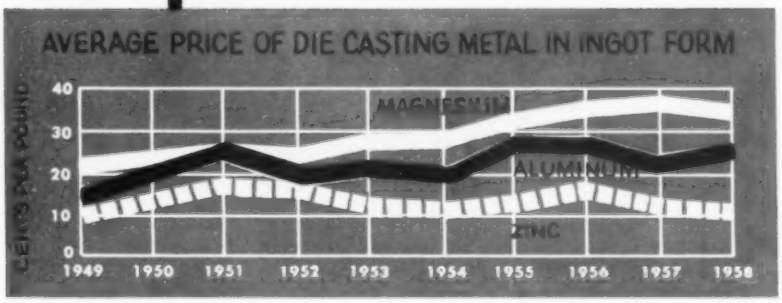
Here's the metal that die casters have used . . .

DIE CASTING FORECAST



DATA FROM U.S. DEPARTMENT OF COMMERCE

And this is what they've paid for it



But in 1959 . . .

Die Casters Will Use More Metal Than Ever

WE have seen the use of die castings by all industries grow over the past several years. There have been ups and downs, but the general trend has been up and at a rate that is far greater than demanded by either population growth or increase in gross national product. The reason is clear, *economic pressure.*

In spite of a somewhat disappointing year in 1958, there is every indication that there will be an increasing demand for die cast products.

Sales of both zinc and aluminum die casting alloys will unquestionably go up. Price will have some effect, particularly as larger and larger castings are made. In the large parts, those weighing more than three to five pounds, the cost of metal becomes more and more important.

The picture for the more important die castable metals is:

ALUMINUM

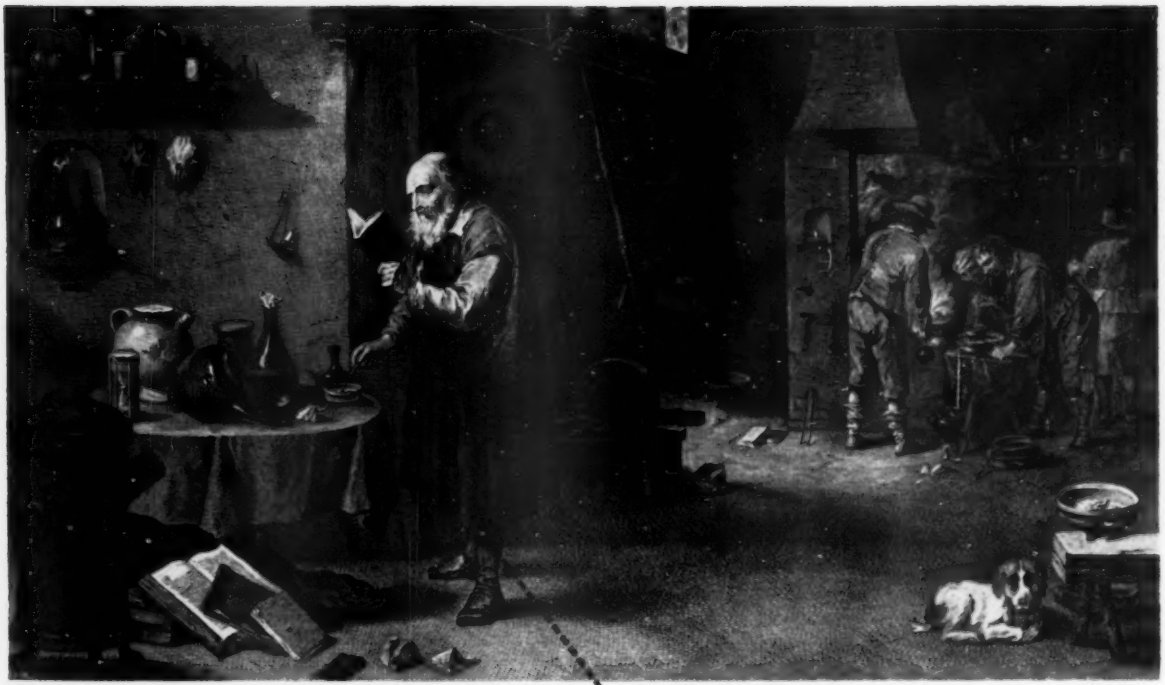
Over the past ten years the price of aluminum die casting alloys has increased by about 40%. This alone is not serious except that it indicates a trend that can work a hardship on the consumer of large castings if it does not halt or, at least, slow down.

Over the years, the aluminum market has followed steel in price changes and the most recent increase in steel prices may, if past experience is a guide, indicate an increase in aluminum prices in the near future.

Most of the known applications, or contemplated applications, of very large die castings are in aluminum. Castings are now in production that weigh from 40 to 50 pounds and even bigger ones are contemplated. Even a small price increase can be ruinous for these contemplated uses.

The estimated consumption in 1958 of 155,000 tons of aluminum base die casting alloy is only a fraction of the amount that will be used in the foreseeable future if the price does not scare consumers out of the market.

continued on page 58



We've come a long way

Technical Advances

TRANSMUTATION - - - the alchemists dream — *today's reality*. For just as the chemists and metallurgists of the middle ages tried to transform base metals into gold, today's die caster with modern equipment and advanced know-how transforms his base metals into production gold.

But advanced as it may be, die casting today is only on its threshold, the full potentialties are still to be explored and developed. What has the past year brought out and what research is now going on?

The greatest advances during the past year have probably been the more widespread use, and the development, of vacuum die casting and cast die cavities. There are some ten different systems of vacuum die casting in active production.

With the exception of the one arrangement that uses an air tight hood around the die blocks, all of these methods depend on evacuation of the die cavity at either the parting line, through the ejector box or through a vacuum channel machined into one of the die blocks.

Regardless of the particular system employed, more and more castings are being made under reduced pressure. The greatest advantages seem to be in better die fill, improved surface, increased speed in casting aluminum, thinner walled castings, and the possibility of casting sluggish alloys.

Impressive as these gains are, it is probable that vacuum die casting has only demonstrated a few of its potentialities.

The use of cast cavities, while not new, has found far wider use and acceptance. Major economies in tooling costs are possible with this method of die making. Up to now, only the accepted hot work die steel has been cast. Development work indicates that many other compositions of die steel can be cast that will widen the field of alloys that can be die cast.

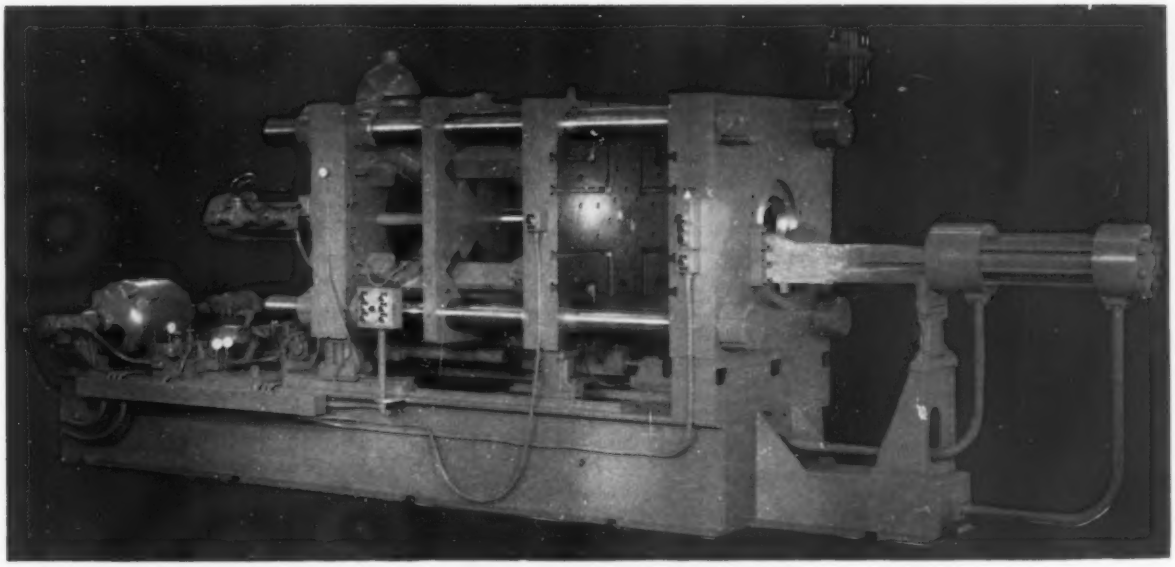
At least one company is known to be working on radically new die materials which, if present developments are borne out, will make die casting tools available for casting many of the high temperature metals and alloys.

And in addition to the development work being done by the individual die casting companies and by associated industries, both the American Zinc Institute and the American Die Casting Institute are pushing their long range research work.

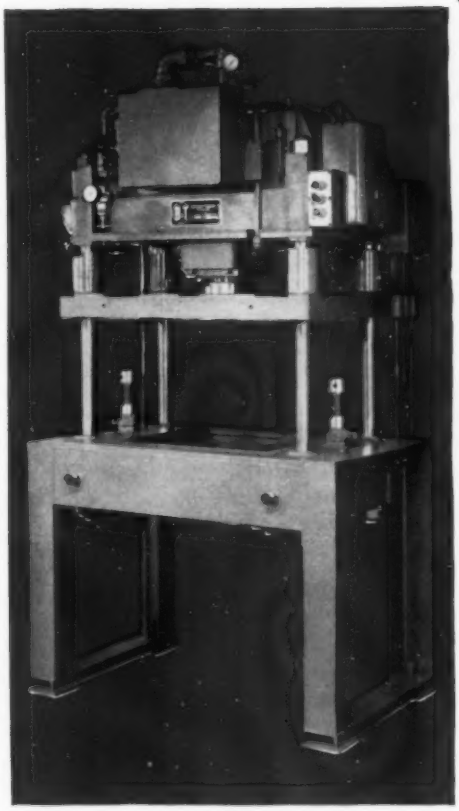
The AZI has active work in progress at Battelle Memorial Institute on Improvement of the corrosion resistance on copper/nickel/chromium plated die castings. The development of procedures to minimize or replace mechanical polishing and buffing. The development of new finishes, for example by anodizing. All of these, of course, on zinc die castings.

The AZI reports; "Promising leads have been developed on the problem of improved corrosion resistance which are being further pursued. These involve a modified exterior chromium plate and various combinations of sub-surface plate layers. The pro-

continued on page 61



*A Winning Combination!



*B&T DIE CASTING MACHINES

incorporate many structural superiorities which assure higher output of castings of high, uniform density and finest finish . . . at the minimum of labor and maintenance costs. Write for description bulletins.

Made in cold chamber and gooseneck types of 125, 200, 300, 400, 500, 600, 750 and 800 ton capacities . . . the product of more than 35 years of die casting experience.

*B&T DIE CASTING TRIM PRESSES

The perfect team-mates . . . a winning combination in the production of fine castings at low cost. The 25 Ton Air-Hydraulic Model Press shown here is exceedingly fast and efficient. Approach speed is 1300 IPM; Pressing speed, 60 IPM; Return speed, 550 IPM. Die Capacity is 17″ x 33″, stroke 0″ — 12″. It can be moved easily from place to place. Write or phone for complete details.

You are cordially invited to use our independent RESEARCH CENTER for the furtherance of DIE CASTING technique.

B&T MACHINERY COMPANY BUSS

201-217 WEST EIGHTH ST., HOLLAND, MICHIGAN • PHONE EXport 2-2341

SUBSIDIARY OF BUSS MACHINE WORKS — MANUFACTURERS OF MACHINERY SINCE 1862 — REPRESENTED IN CANADA BY UPTON BRADEEN & JAMES, LTD.

For more information circle No. 12 on the Reader Service Card

ORDER YOUR COPY TODAY!

40 pages and binder $5.00

A "MUST" IN SPECIFYING AND BUYING DIE CASTINGS AT THE MOST ECONOMIC LEVEL

The ADCI PRODUCT STANDARDS FOR DIE CASTINGS are designed to help you to get the most from the die casting process. With the 40 pages of ENGINEERING, METALLURGICAL and COMMERCIAL Standards in this handsome ring binder as your guide, you can design and purchase serviceable and quality die castings on the most economic basis.

The American Die Casting Institute, as the representative of the country's 125 leading custom die casting companies, has prepared the PRODUCT STANDARDS FOR DIE CASTINGS as a service to the customers of the industry.

USE THIS FORM TO ORDER YOUR PRODUCT STANDARDS MANUAL

AMERICAN DIE CASTING INSTITUTE
366 MADISON AVE., NEW YORK 17, N. Y.

Send_____ PRODUCT STANDARDS FOR DIE CASTINGS manuals at $5.00 each

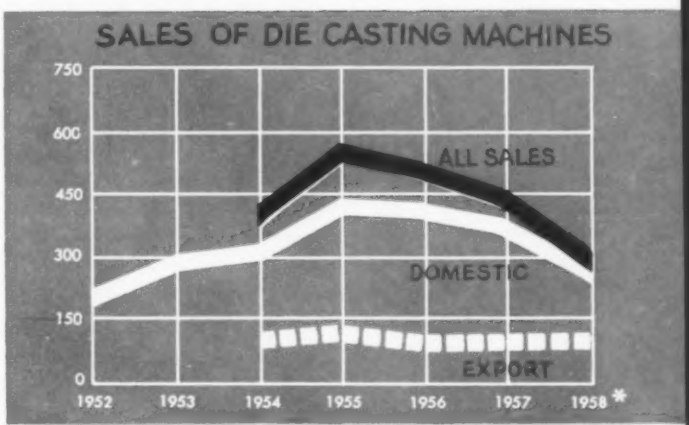
☐ Check attached
☐ Bill to company

Name_____
Company_____
Address_____
City_____ Zone____ State_____

1

For more information circle No. 1 on the Reader Service Card

IN UNITED STATES							
HOT							
Tons Locking Pressure	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958***
under 100	52	64	73	83	111	129	92
101-250	16	16	15	39	32	8	7
251-400	5	27	8	32	23	17	9
401-500	19	22	41	49	22	27	17
501-750	5	20	20	43	12	3	3
751-1000	4	4		10	20	1	4
TOTAL	101	153	157	256	240	185	132
COLD							
under 100	4	1	4	8	14	13	10
101-250	12	16	19	13	14	9	8
251-400	38	43	28	39	28	30	7
401-500	17	27	37	29	12	24	14
501-750	21	30	57	62	73	66	17
751-1000	5	16		22	11	33	20
TOTAL	97	142	145	173	160	175	76
EXPORT							
HOT							
under 100			45	65	73	52	58
101-250			12	5		3	2
251-400			5		3	5	3
401-500			2		2		
501-750							
750-1000							1
TOTAL			64	70	78	60	64
COLD							
under 100			11	12	8	7	8
101-250			11	10	4	8	4
251-400			10	15	1	1	2
401-500			2		1		
501-750			3	4		2	
750-1000				1	2	1	2
TOTAL			37	42	16	19	16



* ESTIMATED

Machines Will Sell Faster in 1959

TOTAL MACHINE SALES							
DOMESTIC							
Tons Locking Pressure	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958***
under 100	56	65	77	91	125	142	102
101-250	28	32	34	52	46	17	15
251-400	43	70	36	71	51	47	16
401-500	36	49	78	78	34	51	31
501-750	26	59	77	105	85	69	20
751-1000	9	20		32	31	34	24
TOTAL	198	295	302	429	400	360	208
FOREIGN							
under 100			56	77	81	59	66
101-250			23	15	4	11	6
251-400			15	15	4	6	5
401-500			4		3		
500-750			3	4		2	
751-1000				1	2	1	3
TOTAL			101	112	94	79	80
ALL							
under 100			133	178	206	201	168
101-250			57	67	50	28	21
251-400			51	86	55	53	21
401-500			82	78	37	51	31
501-750			80	109	85	71	20
751-1000				33	33	35	27
TOTAL			403	541	494	439	288

IN spite of general business conditions, there has been a marked trend over the past several years toward larger die castings – particularly in aluminum.

In the locking pressure range from 500 tons up, each year, except 1958, has set a new record. From only 35 machines in this range in 1952, this market has grown to 106 units in 1957.

The dip in machine sales in 1958 does not indicate a saturated market, rather a probable iterim between a period of semi-experimentation and top production.

Almost every major consumer of die castings is planning larger, more complicated parts. In these parts the cost of metal begins to be a major factor.

In the past couple of years, steel stampings have been able to compete seriously with die castings for some parts such as automotive grills, instrument clusters, tail light assemblies and a few others. But with zinc prices remaining stable and steel prices rising, it is highly possible that the economic advantage will

continued on page 60

DIE CASTING FORECAST

There Will Be A Lot More Die

More Aluminum...*

Consumption of aluminum die castings in 1959 model cars is expected to show a 15% gain. Compare this with an increase of 8% in 1958.

THE accelerating use of aluminum in American automobiles will increase the automotive industry's 1959 consumption of aluminum by nearly 50% more than 1958, according to V. E. Flaherty, automotive industry manager of Kaiser Aluminum and Chemical Sales, Inc.

The average amount of aluminum in the new models will increase. It will be 14% more than in this year's models, according to a company-by-company survey of the industry conducted by the staff of Kaiser Aluminum's market research department.

The average amount used in each car will be 57.1 pounds, compared to 50 pounds this year and 46.3 pounds last year.

Flaherty stated, "This continuing upward trend is significant in the light of predictions that 1959 will be a good year for the auto industry."

Basing his figures on a forecast of a car production volume of 5.9 million, he said, "The industry will require 337,000,000 pounds of aluminum. This compares with an estimated 228,000,000 pounds used by the industry in 1958."

He added, "The outlook is brighter as we project our calculations into the early 1960's when the use of major new aluminum components like engine blocks, bumpers, and radiators is expected."

Flaherty pointed out that, "Cast applications, engine blocks, and particularly wheels, represent a tremendous potential volume." He estimates that by 1962, an additional 200,000,000 pounds of aluminum will be needed for castings.

This means, according to the Kaiser official, that a total of "some 72 pounds of castings will be in the average automobile."

Aluminum's gains in next year's models are due to a more liberal use for moldings and trim areas. Another reason is increased use in optional equipment where aluminum's versatility in product design, ease of fabrication, adaptability to a variety of finishes, and low cost, are determining factors.

Fords, as a group, will show the largest advance with an average increase of 17% per car. A jump from 46.2 pounds to 53.8 pounds. Chevrolet again will lead with an increase of 21% more than 1958, an average of 42.3 pounds per car compared with 34.9 in 1958.

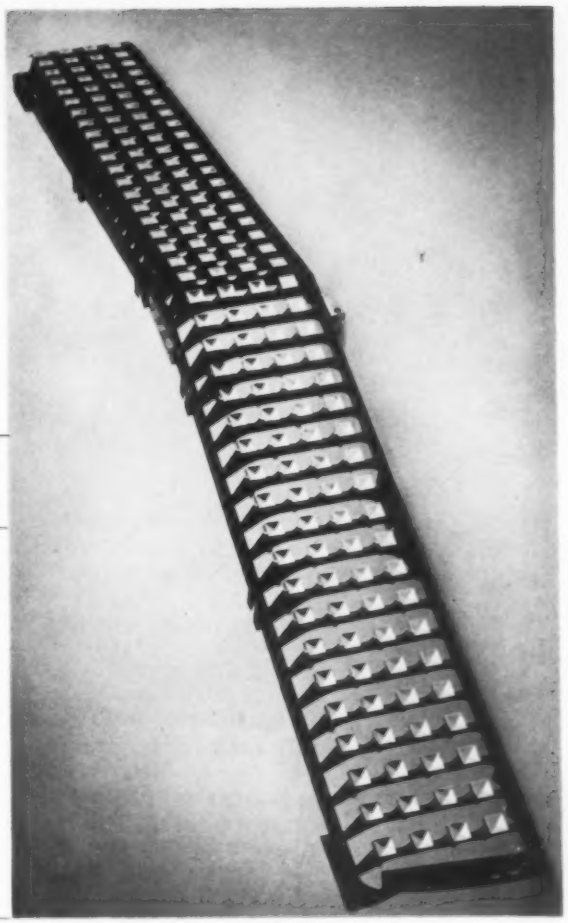
Chrysler will use the most with an average of 73 pounds for each car. This is an increase of 6%. The company's Imperial line will again lead all automobiles with an average of 131.5 pounds per car. Some top luxury models will use more.

FORECAST AVERAGE POUNDS OF ALUMINUM PER CAR 1958 vs. 1959

	Pounds Per Car Average		Per Cent Increase
Car Make	**1958**	**1959**	**1959 over 1958**
Chevrolet	34.9	42.3	21%
Pontiac	50.0	52.9	6
Oldsmobile	62.9	70.6	12
Buick	70.2	73.8	5
Cadillac	78.7	79.7	1
General Motors	47.3	54.1	14%
Ford	41.9	50.9	20%
Edsel	66.8	67.3	1
Mercury	55.4	56.5	-6
Lincoln	97.7	91.8	-6
Ford Motor Company	46.2	53.8	17%
Plymouth	59.5	61.7	4%
Dodge	60.7	64.2	6
DeSoto	94.3	102.3	8
Chrysler	111.3	116.3	4
Imperial	135.2	131.5	-3
Chrysler Corporation	68.9	73.0	6%
American Motors (Rambler)	54.9	53.4	-3%
Studebaker-Packard	26.2	26.2	0%
All Makes	50.0	57.1	14%

*Forecast by: Kaiser Aluminum and Chemical Sales, Inc.

1. WEIGHING 23.34 POUNDS, the zinc die cast Buick grille contains 160 chrome-plated, three-quarter-inch squares.



Castings In '59 Cars

More Zinc...**

Reasons Why Zinc Die Castings Are So Popular

1. Zinc has a low melting point of 787° F
2. It can be cast in thin sections at a high rate of production
3. It can be cast to close tolerances, reducing secondary operations to a minimum
4. It gives accurate, heavy-duty, shock resistant parts of high quality
5. Zinc lends itself to attractive, low-cost finishing

The American Zinc Institute

NEXT year more zinc die castings than ever will be used in American automobiles.

This year, Buick tops the list of car manufacturers who increased their use of zinc die castings in current models. The company uses 164.3 pounds in the Roadmaster Model 75, four-door-Riviera.

This is 24 pounds more than last year's model.

It represents a total of 149 zinc die castings used for functional and decorative parts.

The properties of zinc die castings give the designer a lot of flexibility. Some of the zinc die cast parts used by Buick are: radiator grilles, rear-lamp and carburetor assemblies, and decorative parts.

Heaviest die cast zinc part is the massive radiator grille seen in figure 1.

The smallest, weighing .005 pounds, is a part in the rear-view mirror assembly.

Buick's zinc die cast radiator grille is a complete design-departure from the automobile industry's traditional form and treatment of car-fronts.

Before, grilles always had horizontal or vertical chrome bars. This idea was repeated year after year—but this year it's different.

Chrome-plated squares are set in four sweeping rows extending across the front of the car so as to accentuate the "low breadth" of the current models.

There are 164 of these squares, each measuring ¾ inch on a side. They are made up of four tri-angular surfaces which are designed to reflect maximum light. The grille is cast on a 1000-ton machine.

The casting-die is made so that hand-work by the machine's operator is cut to a new low. All he does is take out the casting, quench it, and press a button. All other operations are automatic. To make the grille any other way would have been too expensive.

Indications are that this grille will probably be used in next year's models too.

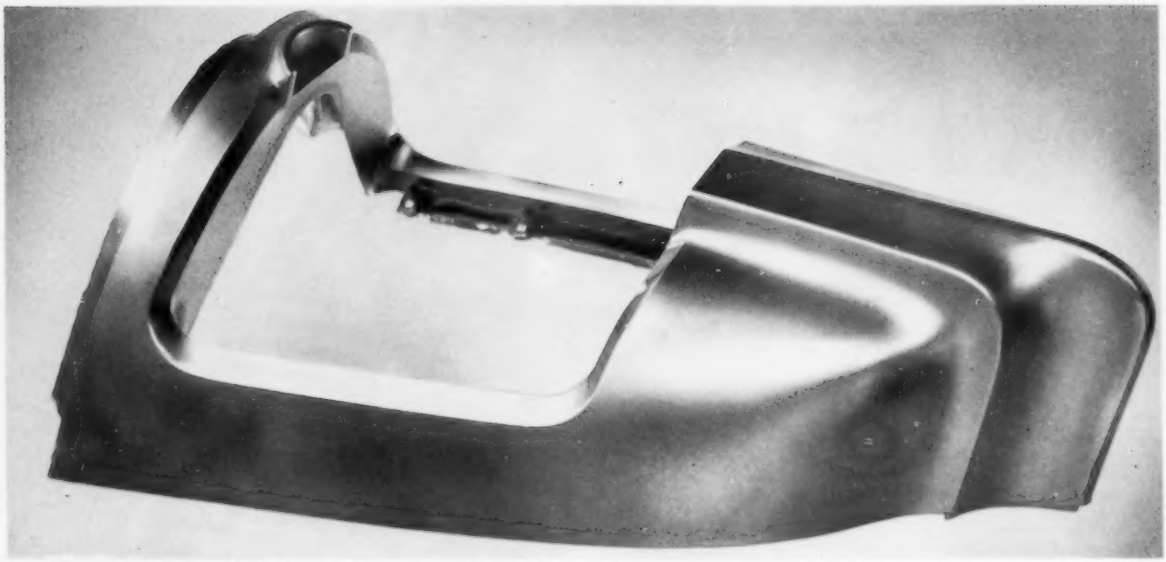
The 1959 Buick will also have zinc die-cast tail-light assemblies. The lamp's eight-pound housing is seen in figure 2.

This year's assembly is one of the biggest, toughest to produce in the automotive industry. Wall-thickness ranges from .07 inch to .35 inch, a sample of the flexibility of the zinc die casting's design. Four castings are used in the tail-light: a right-hand and a left-hand lamp, in two series.

Designing and using thin-walled castings solved the problem of blistering. This was a common headache when thick, heat-holding walls were used. Machining operations are greatly reduced. Only one

continued on next page

**This is a special report to PMM magazine from the AMERICAN ZINC INSTITUTE.



2. VARYING WALL-THICKNESSES of this main part to Buick's tail-light assembly range from a low of .07" to a high of .35". The die casting weighs eight pounds and illustrates extreme design flexibility that is possible with zinc.

finishing operation is needed: Tapping the cored holes.

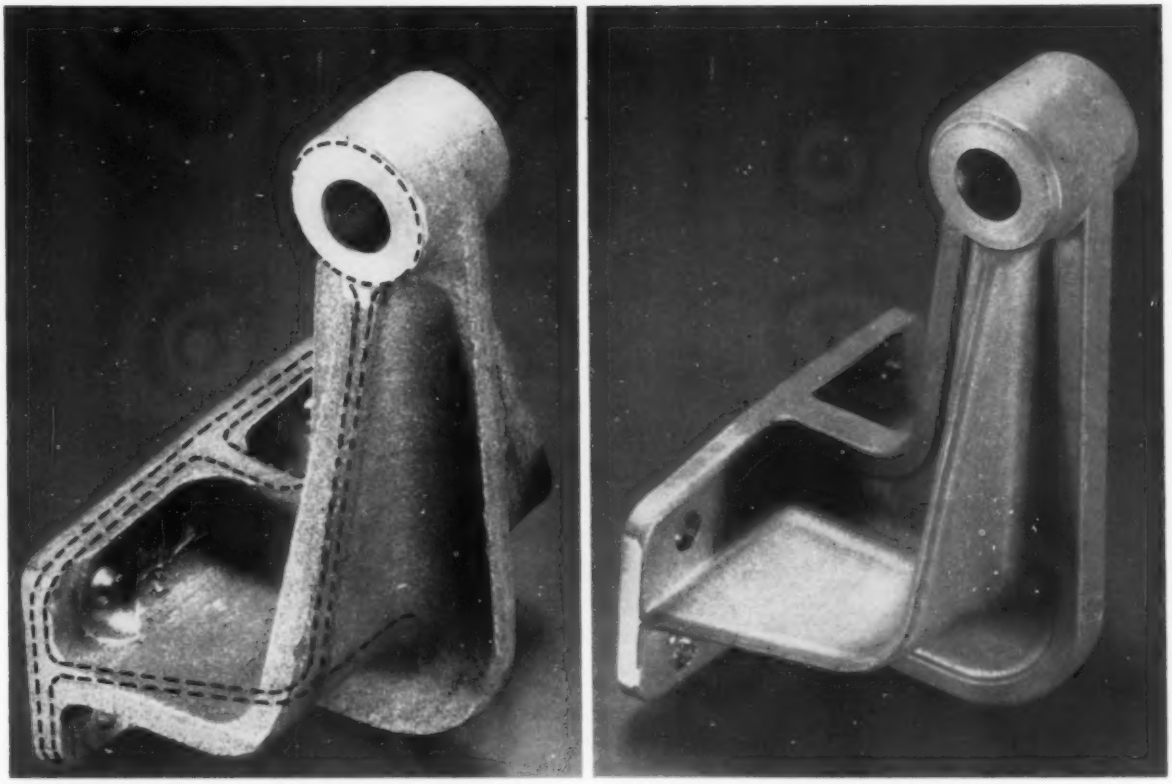
Die casting solves another problem: The coring problem. This is especially difficult when a large, intricately shaped part is being cast. The casting used by Buick has deep recesses with compound curves. Ribs are also cast in at points of critical stress.

The CV window frame seen in figure 3 is used in current Buick cars. It shows how an intricate zinc die casting combines excellent design with usefulness.

This part will be used in next year's automobile. Coring was pulled obliquely and in all three geometric basic directions.

Next year the American automotive industry will, without a doubt, use many more zinc die-cast components than will be consumed in 1958.

3. COMPLICATED CORING makes the die casting process mandatory in the production of this CV window frame in zinc.



CUT COSTS, improve your product by using PMM processes. Left, a sand cast hinge; right, permanent mold cast hinge. The permanent mold casting is better and costs less than sand. *Photos: courtesy Eastern Casting Corp.*

An analysis may show that . . .

Sand Castings Are Expensive

SO, you want to reduce manufacturing costs.

Did you ever take a look at some of the simple, low cost sand castings that you are buying and then machining so they can be used? Try it some-time.

Take the cost of the casting delivered to your plant. Add to it the cost of machining. Then add the cost of rejects and the cost of handling and inspection. Then get a quote on the part made by one of the PMM processes. You probably will be pleasantly surprised; the company who uses the hinge casting shown in the illustration was.

Let's take a look at sand casting the hinge compared with permanent mold casting it. Comparative steps are seen in Table I.

The difference is only two steps, but one of them, *machining*, can be mighty expensive.

TABLE I

Sand Cast Hinge
1. Purchase rough casting
2. Inspect
3. Ship to outside shop for machining
4. Re-inspect after machining
5. Send to assembly
Permanent Mold Cast Hinge
1. Purchase finished casting
2. Inspect
3. Send to assembly

TABLE II

Sand Cast Hinge
1. Machine base for flatness
2. Drill mounting holes
3. Counterbore mounting holes
4. Straddle mill main boss
5. Drill and ream pin hole
6. Deburr main boss
Permanent Mold Cast Hinge
1. Drill and ream pin hole

STRENGTH

The hinge supports a heavy panel on an electronic computor. Failure can be disastrous, but the sand cast aluminum is OK.

ACCURACY

The mounting base must be flat. The pin bore centerline must be parallel to the base and held to close dimensional tolerances on height above the base.

The pin-hole diameter must be held to $+0.003, -0.000$. The faces of the main boss have to be parallel and the distance between them held to $\pm 1/64''$.

The boss edges must be free of burrs. The mounting holes must be

continued on page 60

Cast Die Cavities ... Part III

By IRWIN LUBALIN*

This is the third and last of the series of articles on the use of the Shaw process in the manufacture of dies used in die-casting. The first article told *why* the Shaw process was able to produce useable dies — successfully!

The second describes *how* the Shaw process did it, and listed the advantages gained.

The third and last article honestly lists the disadvantages of the process. It also outlines the *future* prospects and growth of the process in the efficient casting of dies used for die-casting — **The Editors.**

Disadvantages — If only the foregoing were the case, obviously there would be no die-casting dies made by any other method. However, there are certain disadvantages which must be weighed in the production of some cavities and cores.

1. *Ductility* — Since this is a cast structure and is not a wrought bar or forged block it has no directional grain and consequently has less ductility than a piece of bar stock. Therefore, it is advisable that any long slender prongs or slender protruding cores of a die, be set in as inserts. Otherwise, they would be more subject to being broken off due to lateral movement.

2. *Impact Resistance* — There is, of course, a considerably lower impact resistance than on forged block cavities. This is not as consequential in the manufacture of die-casting dies as in stamping dies or trimming dies. Shaw-cast forging dies for both press-forging and drop-forging show such excellent die-life when accurately set that we do not anticipate that impact resistance would be a major problem in a die casting machine.

However, it would be a factor to consider in the design of trim dies as cast by the Shaw Process. These should be designed both as castings and as dies.

*General Manager, Shaw Process Development Corp.

3. *Tolerances* — Here again it must be remembered that the Shaw cast cavity is a casting and is consequently subject to the dimensional variations found in any casting. Even a group of die castings will vary one from the other to some slight degree depending on such variables as injection temperature, die temperature, solidification dwell prior to ejection etc.

Although there is a rule-of-the thumb solidification shrinkage which may be estimated in manufacturing die-casting dies, the casting does not always follow this solidification rule and may vary somewhat depending on its configuration. This is true of steel castings excepting that having a much higher rate of contraction, steel castings are subject to a greater variance.

However, as outlined above, no dimensional variations take place between the pattern stage and the solidification of the steel in the mold, consequently much closer tolerances can be achieved in large Shaw castings than in any other so-called precision casting processes. An average of ±.003″ per inch has been held consistently on dimensions up to 3″ in length. On dimensions of 3″ to 6″ an over-all tolerance of ±.005″ may generally be held, and on large castings up to 500 lbs. and 800 lbs. in weight a tolerance of ±.010″ may generally be held. Where closer tolerances than these are required, it is necessary to leave a slight amount of extra stock across critical dimensions which can be polished off in the final finishing of the dies.

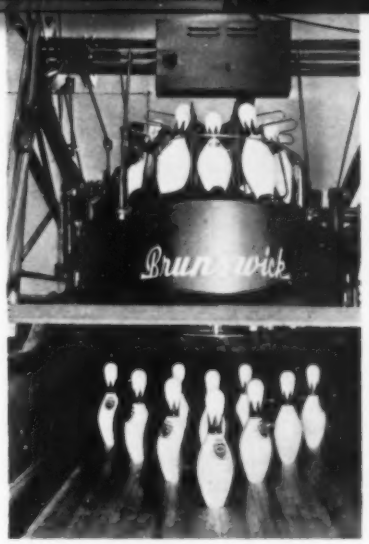
Future — With satisfactory definitive life tests coming in on zinc, aluminum, and brass applications, and as licensees increase their steel pouring capacity and improve their technical proficiency, the Shaw Process can drastically change the die-making technique of the die casting industry. Rapidly produced dies of low cost mean many casting jobs will be manufactured by the die casting process.

By virtually eliminating the high cavity-replacement cost in brass and aluminum die casting, an entirely new concept is in the offing, especially in brass die casting.

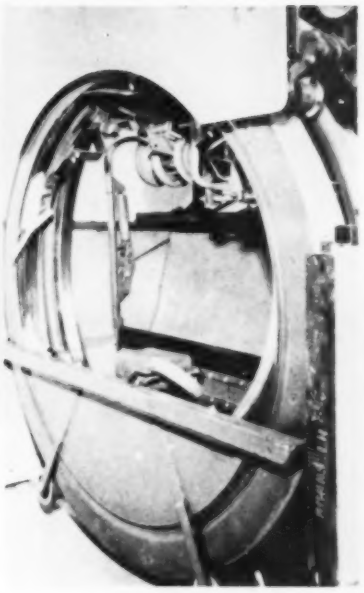
The high rate of die wear has been the major stumbling block to the widespread use of brass die casting. Because of the tool amortization factor most brass castings are today made in sand, shell, and plaster molds. In each case the expense of a replaceable or an expendable mold is involved. This can be eliminated by the use of low cost die casting die inserts which can be easily and readily replaced at low cost. The entire economics of brass castings swings around in favor of die castings even when small quantities are involved.

Thus, at the very least the process presently offers a rapid economical way of producing die casting dies and replacement cavities as well as trim dies, machining fixtures, masking fixtures etc. It offers the very good possibility of vastly improved die life, and of considerably augmented business volume based on the ability to do jobs which would previously have gone into other competitive types of manufacture due to high die costs and long lead time on machining die casting dies.

It has a possibility of opening up a completely new and lucrative field to the die caster in brass, bronze, and copper-alloy die casting and may even prove to be the vehicle for the economical production of cast iron die castings. A major company in England is already using Shaw cast dies for permanent mold casting cast iron and the possibilities are wide open for further exploration in this direction and others.



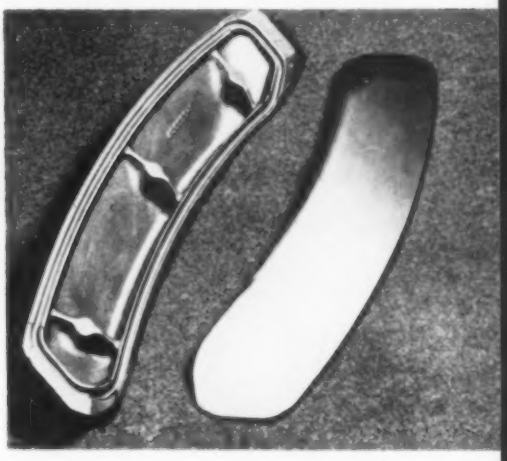
READY TO BOWL, the automatic pinsetter is seen in the closeup. It holds a full set of bowling pins which have been picked up by the pin-wheel buckets and carried to their correct position on the alley.
Photos: Bennett-Ireland, Inc.



PIN-WHEEL BUCKET is seen at the top of the pinsetter in this rear-view picture. Its duck-bill shape allows the part to pick up bowling pins and carry them to the top area.

SHELL MOLD CASTINGS

SHELL MOLD CASTINGS have a fine grain finish and are held to very close tolerances.



Here's proof that a . . .

Redesign Can Lower Your Part-Making Costs

ONCE it took a long time to make the pin-wheel buckets used to set bowling pins in automatic pin-setting machines. The parts were sand-cast. Finishing sand castings leaves a lot of scrap — and it takes time.

Time is money!

And so users of the parts: The Otis Elevator Co.; and the Murray Corp. of America, called upon Bennett-Ireland, Inc., shell molders, to help in their redesign.

The result:

The pin-wheel buckets made of ASTM 35-grade grey iron, are cast in close-tolerance shell molds. The cash saving is impressive.

How are these castings used?

Seven pairs of pin-wheel buckets are set around the outside edge of the pin-wheel elevator inside the pin-setting machine.

As they revolve on the pin-wheel, they pick up and carry toppled bowling pins up to racks where they are held until set in the alley.

The duck-bill shape of the shell mold castings makes it easy for them to pick up pins and hold them tightly.

It is this specific shape which makes the parts especially valuable. It also makes them difficult to produce by any other casting process.

How are they made?

Bennett-Ireland, Inc., produces the eight-pound shell mold castings by blowing cope and drag shells on a Harrison shell core molder, then making them a single unit by sealing them under pressure with a low-temperature phenolic adhesive.

Of course the shell mold castings need some finishing operations. All castings are disc-ground with 40-grit discs. Then, the outer surface which touches the bowling pins is belt-ground with 80-grit belts.

Other finishing follows: Both ends are milled and three holes are drilled and tapped. Then, the parts are finished on abrasive belts to 20 RMS micro-inch finish. Last, a wax rust preventive is sprayed on.

The buckets cast and finished in this way have a fine grain finish that is held to extremely close tolerances by the manufacturer.

Because of the switch to shell mold castings, the automatic bowling pinsetter is a more easily marketed product of higher quality.

This part cast from a magnetic alloy, Hipernik®, cut production costs 80%

CUT COSTS WITH INVESTMENT CASTING OF MAGNETIC ALLOYS

Many of today's alloys are difficult or impossible to machine or forge. Many magnetic parts and components are so intricate in shape that to machine them would require multiple set-ups. Investment casting minimizes machining costs, yet retains the magnetic properties you need.

Westinghouse can provide castings of high-nickel magnetic alloys that retain comparable magnetic properties of wrought materials. With value and cost analysis so important, consider precision investment casting of your magnetic product components.

Whether you need small quantities of prototype parts or production runs, the Westinghouse Metals Plant has the complete metal facilities and experienced engineers to help improve cost and quality of your component parts. For further details on Investment Castings, ask for DB-52-500. Write Westinghouse Electric Corporation, Materials Manufacturing Department, Blairsville, Pa. J-05006

YOU CAN BE SURE...IF IT'S Westinghouse

For more information circle No. 83 on the Reader Service Card

MORE METAL

continued from page 47

MAGNESIUM

The magnesium die casting industry is not, and has not been, healthy. War time emergencies gave an entirely false impression of the future use of this metal by the die casting industry.

Price of metal is almost the entire reason. Many foundries make dies that can be used interchangeably for aluminum and magnesium. They change from one metal to the other depending upon price. The shift has been almost entirely to aluminum for the past three or four years because of a steadily rising price for magnesium alloys. While aluminum has increased only 40% in ten years, magnesium has jumped over 78% in the same period.

Unless there is a sharp reversal in this price trend there is little hope for any marked increase in the use of magnesium die castings.

ZINC

From the time that stable and castable zinc alloys were developed there has been a steady, and often spectacular, rise in the consumption of zinc die castings.

The growth of this branch of the industry has been measurably helped by a moderately stable price structure and, in fact, by an overall drop in the price of zinc.

There have been some peaks such as the one shown for 1951-1952, but these have not been serious since proper adjustment of dollar value will indicate that zinc, at its highest price in the past ten years, was maintained on a pretty even level.

This stable price structure, plus any government action to protect domestic procedures, should be a big incentive toward the production of more zinc die castings.

The unique advantages that zinc has in castability and finishability over any other die cast metal is another strong argument for the increased use of zinc die castings.

MORE CASTINGS

continued from page 42

The manufacturer has been caught in a squeeze play between rising labor costs and rising capital goods costs. Fortunately there has been a solution — the ever greater

use of die cast components.

The custom die caster has, of course, felt the same squeeze as other manufacturers, but direct labor is a smaller factor in the die casting industry so that net selling prices have not increased by the same percentage.

Another compensating factor has been the steady decrease in some metal prices. (See report on the die casting metal industry, page 47).

The growing tendency among custom die casters to produce a completely finished part (fully machined and surface finished) has further increased the attractiveness of die castings. With lower overhead and, in many cases, more efficient operations, the foundry is often able to machine and surface-finish die cast parts at a much lower cost than is possible in the plant of the consumer.

These basic economic reasons have, therefore, been the major contributing factors in the growth of the die casting industry and will continue to be strong influences in its future growth.

(1) Data from the United States Dept. of Commerce is average wages per hour without overtime for all manufacturing industries.
(2) Data from The National Machine Tool Builders' Association.

New Board Chairman For Ettco Tool

Kenneth W. Meytrott has been elected chairman of the board of directors of ETTCO TOOL & MACHINE CO., INC. Mr. Meytrott will continue as vice president of the company. He has been a director for the past twenty years. At the same time, Edward G. Maylinger was elected president of the company.

Koegler Honored by University of Toledo

Frank J. Koegler, vice president and director of NATIONAL LEAD CO. and general manager of its DOEHLER-JARVIS DIV., has been awarded the honorary degree of Doctor of Commercial Science by The University of Toledo for outstanding contributions to industry.

New Director for Vanadium-Alloys

Thomas F. Collins has been elected to the board of directors of the VANADIUM-ALLOYS STEEL CO. Mr. Collins' election fills the vacancy created by the recent death of James T. Hughes.

It's the **BALANCED *Synclinal* DESIGN**

that makes **MARVEL** Synclinal **FILTERS** Die Casting Industry's **A-1 CHOICE**

SUMP TYPE (cutaway) LINE TYPE (cutaway)

In the plants of America's industrial giants, as well as in smaller plants, Marvel Synclinal Filters are being installed on all types of hydraulic and other low pressure liquid circulating equipment. Marvels are chosen because of their excellent performance in protecting machines and increasing production by reducing down-time. They are proving again and again, their superiority in the one real test — ON THE JOB! The BALANCED Synclinal Design of Marvel Filters provides that all-important balance between maximum ACTIVE filtering area and sufficient storage space for filtered out particles — therefore, longer periods of productive operation are attained at the absolute minimum of maintenance. They meet J.I.C. Standards.

Not only plant operators, but also OVER 800 ORIGINAL EQUIPMENT MANUFACTURERS have recognized the superiority of Marvel Synclinal Filters and now install them as standard equipment.

Specify MARVEL SYNCLINAL FILTERS on New Equipment— Standardize with Marvel's on Existing Equipment

EASY MAINTENANCE

Both sump and line types may be easily disassembled, cleaned and reassembled by any workman, on the spot, in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog). Choice of monel mesh sizes range from coarse 30 to fine 200.

IMMEDIATE DELIVERY

Catalogs contain dimensional charts and complete engineering data making it easy to order a filter for your specific requirements and get Immediate Delivery.

For further information write, wire, phone or use coupon below

MARVEL ENGINEERING COMPANY
7227 N. HAMLIN AVE.,
CHICAGO 45, ILLINOIS
Phone: JUNIPER 8-6023

Catalogs containing complete data available on request

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated—
☐ Catalog #108—For Hydraulic Oils, Coolants Lubricants.
☐ Catalog #200—For Fire-resistant Hydraulic Fluids (Aqueous Base)
☐ Catalog #400—For Fire-Resistant Hydraulic Fluids (Synthetic).
☐ Catalog #301—For Water PMM-9

Name .....
Company .....
Address .....
City .....
State .....

CUT COSTS

continued from page 55

accurately placed and the top surface flat to give a good seat for bolt heads.

Finally the surface finish on the faces of the main boss had to be 63 micro inches or better.

Now to get the required accuracy let's check table II and compare the machining operations required on the two parts.

The saving is clear. But reducing the amount of machining was not the only gain. Because the permanent mold casting is stronger than a sand casting, all section thicknesses could be reduced. This resulted in a weight decrease of 3½ oz. per hinge, 29.5%. Further, by putting a bead on the two ribs, improved stiffness and strength were obtained.

So the decrease in machining costs, decrease in weight, decrease in inspection costs, handling, and rejects all added up to a better part at about 50% less. In fact, the saving was large enough so that the first 2500 hinges ordered paid for the permanent mold tooling.

After that, all of the savings were gravy.

---

59 MACHINE SALES

continued from page 51

favor die castings.

If this type of part reverts to die castings, and as the designs of large parts that have never been die cast before are completed and released for manufacture, there will probably be a sharply increased demand for large die casting machines by users.

The present large machine with 1200 tons locking pressure will be displaced by new ones in the range of 2000 to 3000 tons. This increase will be brought about by the need for larger platens to accommodate new and larger dies.

Two other automobile parts that are almost certain to appear as die castings in the fairly near future are wheels and bumpers. While both of these parts are presently being made as permanent mold castings, full production by even one of the major auto concerns will require die casting.

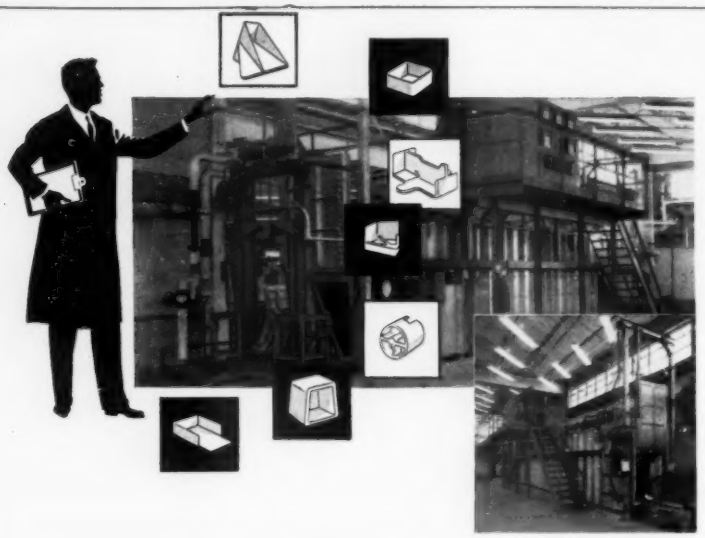
The die cast automobile engine block is certain to become a production item in the near future. There just are not enough machines in existence to cast these blocks. New machines will have to be built.

With the enormous investment in tooling to machine cast iron engine blocks, it may be many years before die cast blocks are standard. But the automobile industry in this country will probably be forced to turn out a small, light weight, economical car. For this car the die cast engine is a natural and the first break may well come in this direction.

In the size range from 100 tons to 500 tons locking pressures, new machine sales will be almost entirely dependant upon improved general business conditions. There exists a substantial surplus of used machines that will have to be absorbed before sales for new units will start to climb rapidly.

However, in the range under 100 tons locking pressure there should be an active market. These machines are the size generally purchased by companies first entering the die casting field. With high cycling speeds and attachments that make them almost completely automatic in operation, many companies look on these little die casters in the same light as any other piece of fully automatic equipment that can fit into a modern high speed production line.

The coming year will probably show a sharp improvement in die casting machine sales.



AUTOMATION PAYS OFF IN THE SOLUTION HEAT TREATMENT OF INTRICATE, CLOSE-TOLERANCE AIRCRAFT PARTS!

C. I. Hayes electric fired equipment maintains Prex Corp's high quality standards at high production rates . . . provides the three essentials for solution heat treatment of aluminum (U.S.A.F. Specs.):

- **optimum temperature control**
- **complete freedom from products of combustion**
- **high speed, automated transfer from heat to quench**

Prex Corp., of Franklin Park, Illinois, pioneers in the production of No Draft Precision PRess EXtruded Forgings of aluminum alloy aircraft parts, uses this Type LA-406 Hayes Electric Furnace to solution heat-treat intricate, close-tolerance forgings.

Their process requires that large aluminum forgings be solution heat-treated at closely held temperatures between 750° to 950° F. The C. I. Hayes electric fired furnace holds temperature well within the ± 10° F allowable variation . . . and totally avoids products of combustion which might cause high temperature oxidation.

Parts are loaded in steel mesh baskets (approximately 80 lbs. per basket) and advance through the automatic, roller hearth furnace in 15-minute cycle stages. At the final stage, loaded basket moves quickly into an agitated, heated water quench. The automated transfer from heat to quench is well within the 10 second requirement — ensuring highest quality of treated forgings. After quenching, the platform rises, and the treated parts are discharged to an integral conveyor. Once the "start" button has been pushed, electric timers control the entire operation from start to finish.

Investigate the many advantages of "push-button" heat treating today! You can reduce labor costs and spoilage . . . speed up production . . . and be assured of "RESULTS GUARANTEED"! Write today!

C. I. HAYES, INC.

Established 1905

819 WELLINGTON AVE. • CRANSTON 10, R. I.

FREE LITERATURE

Please send complete data. I am mostly concerned with the following heat treating procedures.

☐ High Speed Hardening ☐ Stainless Steel Heat Treating
☐ Tool Steel Hardening ☐ Sintering
☐ Carbo-Nitriding ☐ Copper Brazing and Soldering
☐ Tempering ☐ Lead Pot Hardening and Tempering
☐ Vacuum Heat Treating ☐ Atmosphere Equipment
☐ Bright Heat Treating ☐ Other_____

Name_____ Title_____
Company_____
Street_____
City_____ State_____

For more information circle No. 47 on the Reader Service Card

TECH ADVANCES

continued from page 48

gram has included accelerated corrosion tests as well as exposure to the weather of plated panels at Detroit, Columbus and Kure Beach.

The approach to a reduction in finishing costs through the use of a new leveling zinc plate to minimize or eliminate polishing and buffing is practiclarly encouraging. Several pilot line investigations at commercial plants are in operation.

The approach to new, practical and durable surfaces, as through anodizing, has shown some favorable results but is still in preliminary stages."

The Zinc Institute has also announced plans for joint research with the ADCI in the field of improved alloys with higher physical properties.

The American Die Casting Institute has a number of research programs operating under its Die Casting Research Foundation. This work includes such projects as: ". . . vacuum die casting; improved materials (notably die steels, ed.); lubricants and lubricators; process and production control apparatus; research and alloy development."

A further activity in the field of research and development has been announced by AZI. As of September 1, 1958, the personnel of the Institute will be supplemented by the appointment of a Research Director who will be responsible for broad research program expansion to further the science of zinc die casting (see page 102).

As all of this research and development work progresses, the coming years should see some of the greatest advances that the die casting industry has witnessed.

New Instrument Company Formed in Pennsylvania

A new instrument company for the manufacture of pyrometers, thermocouples and accessories has been formed. Known as the PYROMETER COMPANY OF AMERICA, the firm will be located in Penndel, Pa.

Initial operations will be started in a new, 12,000 sq. ft. building. The company plans to concentrate, initially, in the production of a complete line of standard pyrometric accessories.

Get Set NOW for the business upturn . . .

LATROBE
can give you
DIE CASTING DELIVERIES
whenever you need them!

Latrobe Die Castings of Aluminum — Zinc — Tin and Lead Alloys

As surely as night follows day the nation's economy is bound to once more push upward . . . already there are signs of improvement.

This is the time to give your die casting needs close study . . . can you be sure of prompt delivery? . . . are you fully satisfied with the quality of the castings you now use? . . . do your present castings leave something to be desired?

To make the best, then begin with the best castings by Latrobe. Our engineers will work closely with you from design to completion. Be sure of the finest quality workmanship and service. SPECIFY LATROBE DIE CASTINGS.

DISTRICT OFFICES

AKRON, OHIO
E. G. Siess, Jr.
227 W. Exchange St.
Tel: Portage 2-7663

CLEVELAND, OHIO
William Kranz
19615 West Lake Road
Tel: Edison 1-6888

DAYTON, OHIO
J. M. Gallaher
363 West First St.
Tel: Baldwin 4-3523

DETROIT, MICHIGAN
J. R. Lemen, Jr.
1016 Fisher Bldg.
Tel: Trinity 3-5910

NEW ENGLAND
R. L. Thomson
79 Prospect St.
Stamford, Conn.
Tel: Fireside 8-3985

BALTIMORE, MD.
Richard R. Thum
611 So. William St.
Tel: Plaza 2-2514

BUFFALO, N. Y.
Harry W. Harding
235 Burke Drive
Tel: Amhurst 1164

Latrobe Die Casting Co.
Latrobe, Pennsylvania

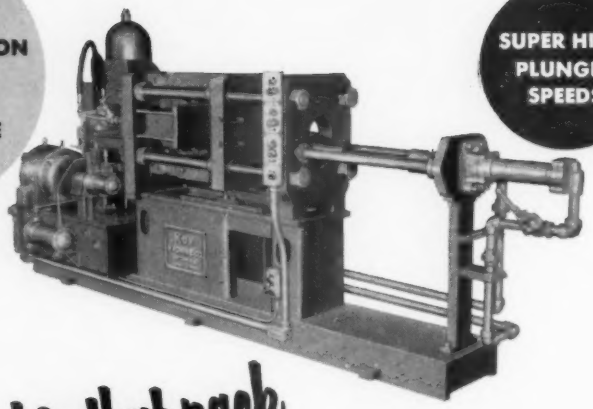
Established 1918

To Make the Best—Begin with the Best Castings!

For more information circle No. 58 on the Reader Service Card

TWO SIZES 100-TON & 200-TON STRAIN GAUGE TESTED LOCKING FORCE

SUPER HIGH PLUNGER SPEEDS



SUPER HIGH INJECTION PRESSURES

BUILT 2 WAYS— PLUNGER GOOSENECK OR COLD CHAMBER INJECTION

Middleweights that pack the power of heavyweights!

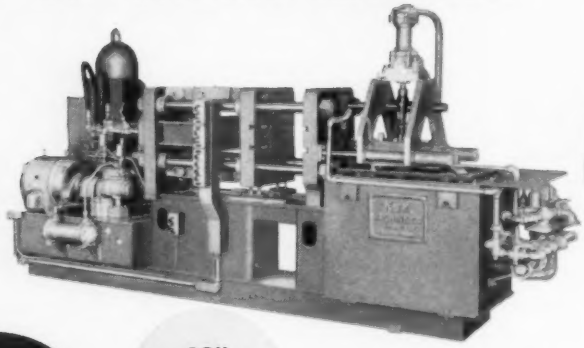
KUX

sensational new

DIE CASTING MACHINES

SOLID STEEL DIE PLATES UP TO 24" x 24" 5" THICK

MAXIMUM OPERATING SPEED WITH OVER 1000 FREE CYCLES PER HOUR



SELF CONTAINED HYDRAULIC SYSTEM WITH OVERSIZED ACCUMULATOR BOTTLE, HEAT EXCHANGER AND PUMP FILTERS

ECONOMICAL TO OPERATE— WITH MINIMUM MAINTENANCE

10" OPENING STROKE

ELECTRIC PUSH BUTTON CONTROLS WITH AUTOMATIC TIMING

Models HP-12 and BH-12 have 100 tons die locking pressure and 12¼" x 15¼" clearance between bars.

Models HP-15 and BH-15 have 200 tons die locking pressure and 15¼" x 15¼" clearance between bars.

KUX MACHINE COMPANY

6725 North Ridge Avenue, Chicago 26, Ill.

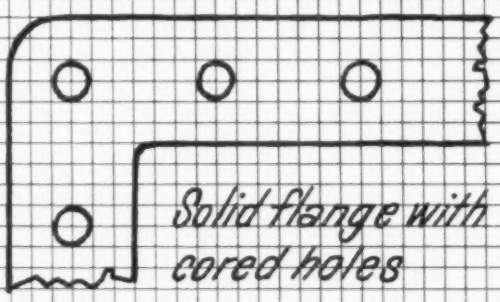
Builders of a full range of die casting machines . . . from 25 tons to 1000 tons in size.

To get the complete story now on these two new hydraulically operated Kux die casting machines, write for catalog today.

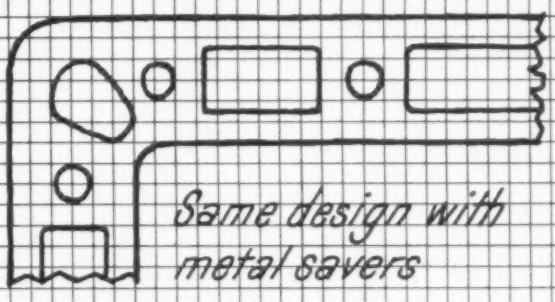
For more information circle No. 55 on the Reader Service Card

Use metal savers to cut weight, lower costs and improve design.

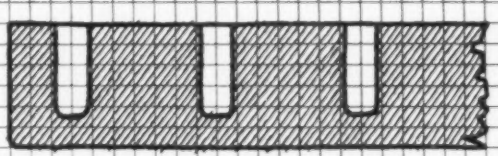
use these
Design Tips
for lower costs -better products

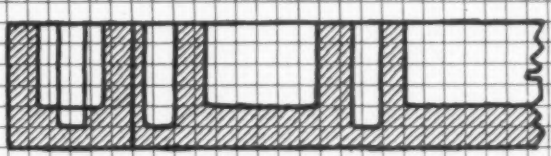


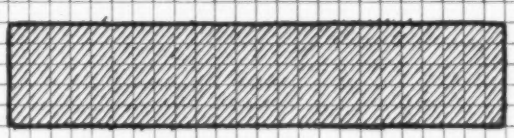
Solid flange with cored holes



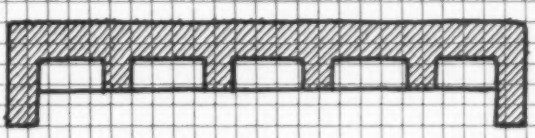
Same design with metal savers



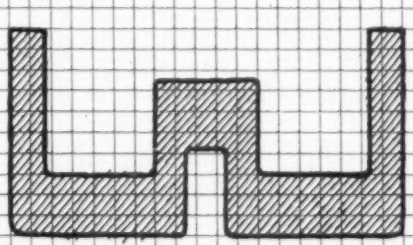




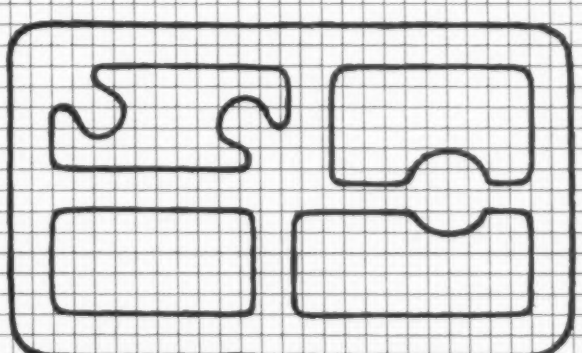
A solid plate is heavy difficult to cast and may show sinks



Ribbed construction is lighter, costs less and casts better



Supporting bosses may often be cored to reduce weight



Design for the maximum amount of open space on supporting members

DATA OFFERED IN THIS MONTH'S ADS

the Reader Service Cards on the facing page will get you these free reference materials. Circle the numbers and mail.

2. **Casting Supplies**—Detailed information is available on Refrax Pots that retain heat, have less swelling and distortion, are tough and durable. ACF Industries.

4. **Melting Furnaces**—Technical information is available on the 60 cycle induction melting furnaces of the Ajax Engineering Corp. Ranging in size from 20 kw to 2000 kw, the furnaces will produce from 150 pounds per hour to 40 tons per hour.

5. **High Speed Steel** — Data Sheet is available on DBL-2 High Speed Steel, giving all needed handling and shop treatment details. Certified laboratory information on physical characteristics is included. Allegheny Ludlum Steel Corp.

10. **Plunger Rings** — of hardened steel give over 100,000 shots per set in many installations. Auto-Diesel Piston Ring Co. will supply complete information.

12. **Air-Hydraulic Trim Press**—delivers 25 tons at high cycling rates, and can be moved easily from place to place. Complete details are available from B & T Machinery Co.

16. **Die Casting Machine**—Buhler Brothers, Inc., offers detailed technical information on their Type GPF, which develops 800 tons of locking force, 60 tons injection force.

18. **Tumbling Media**—A practical guide describes barrel finishing of metallic parts on a mass production basis using "precision-controlled" tumbling media. The Carborundum Co.

19. **Automated Die Castings**—A brochure from Cast-Master Inc., describes a multiple cavity loader-unloader that loads laminations, die casts, trims and unloads 4 rotors automatically.

20. **Minicast Process** — This process which combines the advantages of investment casting with such precision methods as coining, cold forming, etc., is described in a new brochure from Casting Engineers, Inc.

21. **Fire-Resistant Hydraulic Fluids**—A new technical bulletin "Celanese Safety Series", is available from Celanese Corp. of America on their Cellulubes that are available in six controlled viscosities.

22. **Die Casting Machine**—with 1000 tons locking pressure produces aluminum castings of up to 25 pounds. Detailed specifications are available. Cleveland Automatic Machine Co.

25. **Crucible Melting** — Two brochures, "Crucible Care" and "Charging & Melting", are available from the Crucible Manufacturers' Association.

29. **Sprue Bushings**—sprue spreaders, ejector pins and cavity retainer sets are described in literature from Detroit Mold Engineering Co. Includes complete prices and specifications.

30. **Chain Conveyor Testor**—W. C. Dillon Co. offers an illustrated color catalog on the Dillon Dynamometer which can test moving chain conveyors for overload in less than 60 seconds.

31. **Tumbling Shapes**—Data is available on scientifically-designed sintered-metal tumbling shapes from Dixon Sintaloy Inc. This is an entirely new type of tumbling media which has unique advantages for deburring, grinding, burnishing, and dry lubricant coating.

33. **Die-Casting Facilities** — An illustrated 16-page brochure describes the complete services, facilities and equipment of the Dollin Corporation.

35. **Die Profiler**—Price List DV-98 describes a flexible shaft reciprocating tool for grinding, filing, scraping, honing, lapping and polishing. Engis Equipment Co.

39. **Metal Working Lubricants**—for all methods of working aluminum and aluminum alloys are described in literature released by Fiske Brothers Refining Co.

40. **Treating Zinc**—and zinc base alloys, is the subject put forth in a series of leaflets. Foundry Services, Inc.

42. **Die Castings**—"Small Die Castings Exclusively", is the title of a new bulletin from Gries Reproducer Corp. Explained is the company's method for delivering parts of high uniformity, with close tolerances.

43. **Zinc Alloy Facts**—"Reference Book and Guide on Zamak (Zinc Base) Die Casting Alloys", offered by Henning Bros. & Smith, Inc., gives valuable production and design data.

45. **Hydraulic Fluids**—A new bulletin from E. F. Houghton & Co. lists the most complete line of fire-resistant and oil-base hydraulic fluids available from any single supplier.

46. **Die Casting Machines**—Advantages of H-P-M equipment for producing quality castings at high production rates are covered in Bulletin 5700. Hydraulic Press Mfg. Co.

47. **Heat Treating**—Literature is available on the many advantages of "push button" heat treating, possible with Hayes equipment. C. I. Hayes, Inc.

50. **Investment Casting**—"Cast to Outlast" is the title of a 16-page booklet of illustrated case histories that may suggest a practical answer to your problem. International Nickel Co., Inc.

52. **Compacting Press** — using "withdrawal tooling is presented in technical literature from A. Johnson & Co., Inc. The press has among its features any number of movable lower punches, and precise control of powder during compaction.

53. **Trim Presses**—especially suited for removing flash from die castings are described in Bulletin 1958 from Johnson Machine & Press Corp.

54. **Wax Injectors**—Complete specifications and features of three models of all-hydraulic wax injection machines have been issued by Leyden Hydraulics, Inc.

55. **Die Casting Machines**—Two new hydraulically operated die casting machines are described in a catalog issued by Kux Machine Co.

57. **Die Castings**—Literature and design information is available on castings made by Litemetal Dicast, Inc. of Almag 35, where toughness — with strength and shock resistance is essential.

59. **Die Casting Machines**—Information on a complete line is available from Lester-Phoenix, Inc. The units feature reliable clamping, and are readily adapted to vacuum casting.

64. **Metal Powders**—Technical data is available on Grade A-213, electrolytic 100 mesh, non-laminating electrolytic iron powder. National U.S.-Radiator Corp.

67. **Cutting Costs**—with brass powder metallurgy, is explained in a booklet evaluating this modern production method in terms of particular needs. The New Jersey Zinc Co.

70. **Die Components**—which cut set-up time and labor costs are presented in literature issued by Richards Tool & Mold Co.

continued on page 78

PMM AT YOUR SERVICE

THE MOST MODERN Reader Service Department in the publishing industry is staffed, equipped and trained to serve you at PMM. Automatic equipment processes your requests and shoots them on for fulfillment within hours after receipt. The materials you want get to you fast.

THESE TWO CARDS are your tickets to this prompt service. Use them to secure details about any item in this issue that has a key number. These are:

ADVERTISEMENTS—a showcase of the latest in components, equipment and techniques.

NEW PRODUCTS — brief descriptions of significant new production and processing aids.

USEFUL LITERATURE — offerings of new catalogs, data books and other valuable reference materials.

DO NOT WRITE IN THESE SPACES

P 1

JOB

SIC

P 2

P 3

PER

THE FOLLOWING WOULD LIKE TO GET PMM EACH MONTH:

Name _____ Position _____

Name _____ Position _____

Company _____

Address _____

_____

Major Products made at this address: _____

THIS PLANT (USES) ☐ (PRODUCES) ☐ TYPES OF PARTS CHECKED BELOW:

- ☐ Die Castings
- ☐ Extrusions
- ☐ Investment Castings
- ☐ Powder Metal Parts
- ☐ Permanent Mold Castings
- ☐ Plaster Mold Castings
- ☐ Shell Mold Castings
- ☐ None of these

Please type or print clearly

SEPTEMBER, 1958. Do not use after 12-15-58

Name _____ *Position* _____

Company _____ *Kind of Business* _____

Street _____

City _____ *Zone* _____ *State* _____

Please send me information and literature on items circled below.

1	18	35	52	69	86	103	120	137	154	171	188	205	222	23v	256	273	290
2	19	36	53	70	87	104	121	138	155	172	189	206	223	240	257	274	291
3	20	37	54	71	88	105	122	139	156	173	190	207	224	241	258	275	292
4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293
5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294
6	23	40	57	74	91	108	125	142	159	176	193	210	227	244	261	278	295
7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306

Please type or print clearly

SEPTEMBER, 1958. Do not use after 12-15-58

Name _____ *Position* _____

Company _____ *Kind of Business* _____

Street _____

City _____ *Zone* _____ *State* _____

Please send me information and literature on items circled below.

1	18	35	52	69	86	103	120	137	154	171	188	205	222	239	256	273	290
2	19	36	53	70	87	104	121	138	155	172	189	206	223	240	257	274	291
3	20	37	54	71	88	105	122	139	156	173	190	207	224	241	258	275	292
4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293
5	22	39	56	73	90	107	124	141	158	175	192	209	226	243	260	277	294
6	23	40	57	74	91	108	125	142	159	176	193	210	227	244	261	278	295
7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
14	31	48	65	82	99	116	133	150	167	184	201	218	235	252	269	286	303
15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306

Free FACTS AT YOUR FINGERTIPS

FIRST CLASS
PERMIT No. 8066
SEC. 34.9 P. L. & R.
CLEVELAND, OHIO

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

3¢ POSTAGE WILL BE PAID BY Reader Service Department

Precision
Metal
Molding

812 HURON ROAD

CLEVELAND 15, OHIO

FIRST CLASS
PERMIT No. 8066
SEC. 34.9 P. L. & R.
CLEVELAND, OHIO

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

3¢ POSTAGE WILL BE PAID BY Reader Service Department

Precision
Metal
Molding

812 HURON ROAD

CLEVELAND 15, OHIO

FIRST CLASS
PERMIT No. 8066
SEC. 34.9 P. L. & R.
CLEVELAND, OHIO

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

3¢ POSTAGE WILL BE PAID BY Reader Service Department

Precision
Metal
Molding

812 HURON ROAD

CLEVELAND 15, OHIO

SUBSCRIPTIONS to PMM are free if you are 1) management, engineering or purchasing personnel in a plant that 2) produces or uses precision metal molded parts. Just fill out this order card COMPLETELY and mail it.

These two Reader Service cards will bring you copies of any literature offered or described in this issue. To use them:

1. Every ad and literature item has a key number. Circle the number(s) on the card that corresponds to the item you want more facts about.

2. Fill out the card COMPLETELY.

3. Drop it in the mail. No postage needed. PMM will do the rest.

IMPORTANT: To get materials offered in this issue, use only the two Reader Service cards bound in this issue. Be sure to mail them before the expiration date printed on the reverse side of the cards.

PMM Finishing Section

The specialized finishing methods, equipment and materials used to machine, assemble, surface condition or surface coat precision metal molded parts are presented here. This includes all secondary operations which convert a raw casting to a finished product.

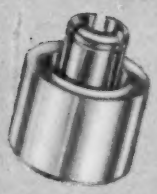
Better precision finishing with powder metallurgy's newest product . . . see *page 74*

HOW MANY WAYS CAN *Special Purpose Fasteners* CUT COSTS FOR YOU?

How many of your products employ laborious, old-fashioned fastening methods where simple fasteners could do the job and cut costs, too? How many parts and sub-assemblies can be adapted to include a self-fastening feature? How many future products could be improved by advance planning for fastener efficiency?

United-Carr's engineering staff offers you a wealth of experience in the design of special-purpose fasteners and self-fastening devices. Large-scale manufacturing facilities (including in-plant plastics molding equipment) ensure economical, *volume* production and prompt deliveries. United-Carr field representatives are ready to call on you at *your* request.

POLYETHYLENE MOUNTING FOOT



No mar, no scratch glide for use on TV receivers, record changers, small appliances, etc. Assembles into round hole in wood or metal cabinets.

NYLON SNAP-IN NUT

Snaps into square hole stamped out of sheet metal . . . provides secure anchorage for any sheet metal or self-tapping screw . . . highly effective electrical insulator.

QUICKEY FASTENER

Eliminates need for welding or swaging studs to sheet metal stampings, facilitates nesting, eliminates damage in transit because Quickey snaps in before final assembly.

THREAD CUTTING FASTENER

Re-usable, self-locking, vibration-proof fastener cuts clean, deep threads on unthreaded chrome-plated studs. Available for ⅛", 3/16" and ¼" studs. Can be driven with standard wrenches.

PLUG BUTTONS

Snap into ⅛" to 3" dia. holes. Can be embossed with ornamental or functional designs . . . various finishes, shapes and sizes.

FISHTAIL RATCHET PLATE

Holds on smooth, die-cast metal or plastic studs to anchor name plates, trade marks etc. on appliances, automobiles, electronic apparatus, etc.

TRIMOUNT STUDS

Hold two or more thicknesses of material together. Easily installed by hand. Insure vibration proof attachment. Permanent or removable. Many shapes and sizes.

V-LOCK TEENUT

Re-usable, self-locking, one-piece, all-metal nut has high tensile strength, is unaffected by heat or oils. In various shapes, sizes and metals.

SOL-A-NUT

Self-locking, rustless, heat resistant. Sturdy, one-piece stainless steel construction prevents corrosion if nicked or scratched.

DURABLE DOT FASTENER

Snap fastener for cloth, leather, plastics and other materials. Positive closure, instant release. Black, nickel or brass finish.

CARR FASTENER COMPANY

Division of United-Carr Fastener Corp., Cambridge 42, Massachusetts

MAKERS OF DOT FASTENERS

For more information circle No. 94 on the Reader Service Card

TYPE OF FINISH	PURPOSE: Applied direct to die cast surface or to plated surface — Final finish: Decorative	Final finish: Protective	Paint bonding	Preparation for plating or chemical finish	APPEARANCE: Clear: Unpolished	Clear: Bright	Colors*: Basic color	Colors*: Others available	PROTECTION: Weathering: Good	Weathering: Fair	Weathering: Poor	Humidity: Good	Humidity: Fair	Humidity: Poor	Salt spray: Good	Salt spray: Fair	Salt spray: Poor	Wear: Good	Wear: Fair	Wear: Poor	PREPARATION REQUIRED: Buffing or chemical polishing	Solvent clean	Alkali clean	Acid clean	APPLICATION METHODS: Immersion	Brush	Spray	RELATIVE COST: High	Medium	Low	FEDERAL OR MILITARY SPECS.: Yes	No	SPECIAL PROPERTIES AND REMARKS
MECHANICAL																																	
POLISHING AND BUFFING				√		√																						√				√	Removal of flash and surface defects.
TUMBLING AND BURNISHING				√	√	√																								√		√	
SAND, SHOT, AND GRIT BLASTING			√	√	√																								√		√	Typical matte surface.
CHEMICAL																																	
CHROMATES LIGHT	√	√	√	√	√	√				√			√			√				√			√	√	√				√		√	Clear to pale iridescence.
MEDIUM	√	√	√				YEL	√		√		√			√					√			√	√	√	√			√	√		Iridescent Yellow. Some may be bleached
HEAVY	√	√	√				O.D. GREEN	√		√		√			√					√			√	√					√	√		Dark Bronze to Olive Drab
PHOSPHATES		√	√				GRAY						√			√				√			√	√	√	√			√	√		No decorative finishes. Used as paint base only.
BLACKS BASED ON NICKEL OR MOLYBDENUM SALTS	√						BLACK				√			√			√		√				√	√					√		√	Decorative only. No appreciable protective value.
ELECTROPLATING																																	
ZINC	√	√			√						√			√			√			√			√	√	√				√		√	Untreated zinc plate tarnishes rapidly.
ZINC + CHROMATE	√	√	√			√				√			√			√				√			√	√					√		√	Supplementary treatment such as a clear chromate is used.
COPPER-NICKEL-CHROMIUM	√	√				√				√			√			√			√		√	√	√	√			√				√	High quality decorative finish. Nickel thickness must be adequate if extended outdoor life is expected.
ORGANIC																																	
LACQUERS AND ENAMELS	√	√			√	√ (if free polished)	ALL	ALL	√				√			√			√				√ (plus chemical treatment)	√	√	√	√			√			

Choosing A Finish For Zinc Die Castings

By RAYMOND STRICKLEN*

ZINC alloy die castings are suitable for many purposes without any finish. Often, however, there are service requirements such as attractive appearance, paint adherence, and resistance to corrosion or to wear which are not met by the raw die casting. Some consideration is necessary in order to select the finish best suited for the job the part must perform.

The requirements for quality of the die casting itself vary with the type of finish to be applied. If the appearance is not particularly critical, or if an opaque organic coating with good hiding and leveling qualities is to be used, there is some latitude allowable in the surface condition. Prime consideration can be given to obtaining the desired mechanical properties in the part at minimum expense.

Selection of a bright metallic finish or a transparent lacquer raises the standards expected in the original surface of the casting. To obtain any economy in the finishing operation, careful attention must be given to the manufacturing of the part. This includes design of the part, composition of the metal, design of the die, operation of the die-casting machine, trimming the castings, and handling the parts between operations performed.

The expected life of the part is an important factor in determining the amount of money to be spent on the finishing job. Metallic and nonmetallic finishes are available in wide ranges of durability, from a few months' shelf storage life to long service under adverse conditions not usually met.

A freshly polished zinc surface is similar to chromium in appearance but a gray film of corrosion products forms rapidly on atmospheric exposure. Several means of maintaining a bright surface are available, the choice depending on the degree of luster and the wear resistance required. Opaque paint finishes gain durability when they are preceded by a chemical surface conversion treatment to provide a paint bond and to block corrosion at discontinuities in the paint film.

A die casting on which the manufacturing operations are completed,

continued on next page

*PRODUCT DIRECTOR, ALLIED RESEARCH PRODUCTS, INC.

CHOOSING A FINISH

continued from page 67

COLORED FINISH

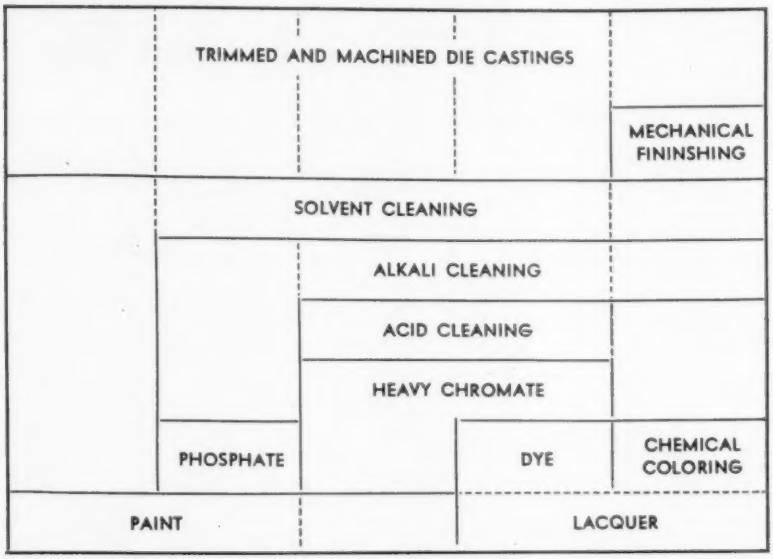


Figure I

BRIGHT FINISH

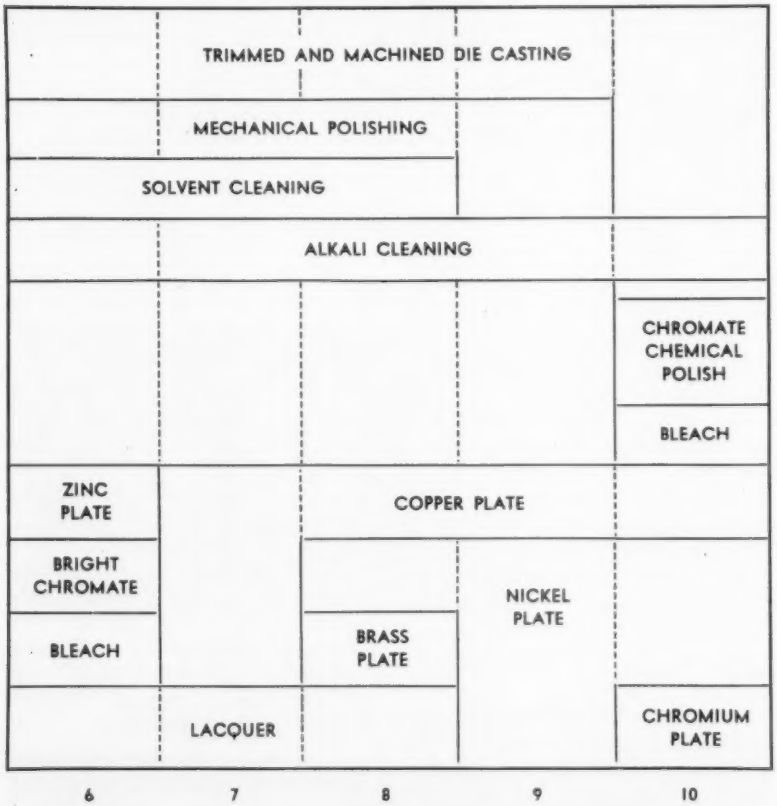


Figure II

can of course be used in the unfinished state if appearance is of no consequence. If the trimming has left traces of flash, or if burr removal is necessary, some form of polishing might be needed.

Figure 1 shows several of the choices possible if a colored finish is desired. A paint finish, column 1, might be applied after the surface is solvent cleaned. These steps represent about the minimum cost in obtaining a colored finish.

Paint in contact with bare zinc can react with the metal to form metallic soaps. These will eventually destroy adhesion of the finish which may be satisfactory initially. If a paint coating is scratched, corrosion can occur under the film and spread from the scratch, causing blistered paint.

These forms of deterioration are eliminated if the metal is chemically cleaned, columns 2 and 3, and a surface conversion treatment applied. A phosphate, column 2, provides increased long term paint adhesion and a chromate, column 3, produces superior results in severe exposures.

The chromate coatings for this application produce iridescent yellow or olive drab coatings which can be dyed various colors, column 4. A clear lacquer provides wear resistance for these colors.

Direct chemical coloring methods, column 5, can be used after chemical cleaning. For example, the finishes based on molybdates or on nickel salts produce a black finish. The corrosion protection of these also may be increased by lacquers.

Paints used on die castings which have not been polished, should have good hiding and leveling power to cover any defects in the castings. Lacquers vary considerably in cost and wear protection, from the lower cost nitrocellulose products, through melamines and methacrylates to the epoxys.

Mechanical polishing can take any of several forms.

For small parts barrel operations are most economical. These consist of cutting down or tumbling operations with an abrasive, usually stones or chips of artificial abrasives to remove vestiges of flash and minor surface defects.

This is followed by a finer abrasive used with a lubricant for coloring or by burnishing with lubricated

steel burnishing forms.[2] Larger parts are finished individually by hand or on automatic polishing equipment. A setup abrasive wheel or abrasive belt may be used for the preliminary cutting down operation. The abrasive chosen should be well lubricated and should be of the finest grit size practical for doing the job. Final coloring of the casting is done by buffing with soft wheels and tripoli compositions in either bar or liquid form.[3]

Polishing lubricants should be removed by a solvent emulsion cleaner, to facilitate further cleaning operations. Alkali and acid cleaning of bright die castings is usually accomplished with mild compositions so as to minimize attack on the bright surface and to avoid overcleaning, which in some cases may be as detrimental as incomplete cleaning.[4]

Figure 2 shows a selection of possible bright finishes. A relatively low-cost finish with good appearance is obtained by zinc plating the die casting. This gives a uniform surface. The zinc plate is improved in appearance by a type of chromate surface conversion treatment, column 6, which chemically polishes and at the same time passivates the surface.

These treatments usually leave a light yellow iridescent surface which can be bleached in a mild alkali, leaving a clear attractive surface approaching bright chromium in color.[5] Supplementing this finish with a lacquer, increases its durability to approach that of the conventional chromium plate in such service as automotive trim.

In the past few years, this finishing cycle, zinc plate, chromate, and bleach, with or without lacquer, has been used in a number of applications. In many instances, a blue to gray discoloration appeared on a bright surface after about two weeks. Considerable effort was expended to overcome this defect. Work in the laboratories of Allied Research Products, Inc., indicated that a relatively high concentration of aluminum in the surface of the die casting is responsible.

It appears that the aluminum may diffuse into the high purity zinc plate at room temperature and cause the discoloration.

The condition was corrected in two ways. Prior to plating, the die castings were etched briefly in a solution of sodium zincate of the type used in preparing aluminum for electroplating. The alternate method was to apply a flash plate of copper or cadmium after cleaning and before zinc plating.

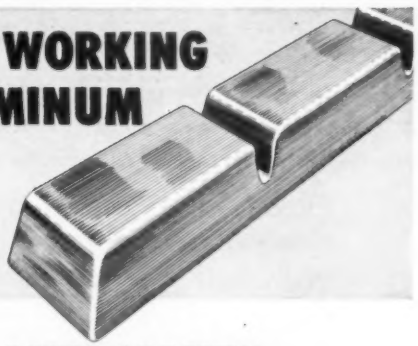
The etching method removes excess aluminum from the die casting surface. The flash plates present a barrier through which the aluminum does not diffuse.

Instead of electroplating, the die casting itself may be chemically polished, column 10, to a luster which is acceptable in many applications. This chemical polishing operation is also of the chromate surface conversion type and is usually bleached to a clear finish in the same manner as the chromate used on zinc plate.

The finishing cycle may end at this point, or a lacquer may be used as with other decorative finishes. The corrosion protection afforded by this finish is superior to

continued on page 80

FOR WORKING ALUMINUM



FISKE LUBRICANTS are especially formulated for working aluminum and aluminum alloys. They will enable you to produce clean aluminum products at lower cost.

Machining	**C.S.A. No. 2 Cutting Oil**
Rolling	**Majestic Soluble Oil**
Die Casting	**231 Die Casting Compound**
Extruding	**514A Hot Die Lubricant**
Stamping	**Magic Compound**
Forming	**Magic Compound**
Wire Drawing	**Magic Compound**

Let us know how you work aluminum and we will send you the bulletin that describes the Fiske Lubricant made for your industry.

FISKE'S Since 1870 — METAL WORKING LUBRICANTS

FISKE BROTHERS REFINING CO.

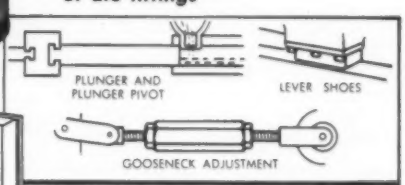
129D Lockwood Street, Newark 5, N. J.
Plants: Newark 5, N. J. and Toledo 5, Ohio

For more information circle No. 39 on the Reader Service Card

HOLD DOWN THOSE DIE CASTING COSTS

In ½, 1-pint and quart cans.

Protect the "hot spots" in your equipment . . . End seizing and galling of die fittings



DIE CASTING DIES

USE Thred-Gard High Temperature Anti-Seize Compound to protect equipment and fittings up to 1200°F. Eliminate production losses and maintenance costs due to heat strain, seizing and galling.

Here's what a drop or two of Thred-Gard will do:

Die casting machines—Reduce down time by insuring continuous, long lasting operation of plunger, plunger pivot, lever shoes and gooseneck adjustment.

Die casting dies—Insure efficient, uninterrupted operation of ejector pins. Prevent thread fracture on screws and hollow head bolts due to seizing and galling—yet, initially, permit them to be drawn to a greater degree of tightness. Save money on your die casting operations. Ask about Thred-Gard. Request a free sample.

Crane Packing Company, 6473 Oakton St., Morton Grove, Illinois. (Chicago Suburb). *In Canada: Crane Packing Co., Ltd., Hamilton, Ont.*

*DuPont Trademark

CRANE PACKING COMPANY

For more information circle No. 24 on the Reader Service Card

Alkalume AC#1 is a safe, easy to use, non-silicated liquid used at low concentration with water. This latest addition to Northwest's outstanding line of specialized chemicals for use with today's modern metals offers these desirable features—

- Non-alkaline, non-etching, non-filming.
- Gives uniform, unblotched brilliance.
- Wets out unusually well.
- Ideal as follow-up to heavy-duty precleaner.
- Excellent as single stage cleaner for light soil.
- Economical to use.
- Unusually long service life.
- Non-hazardous, no offensive odor.
- No disposal problem.

Got a Problem? Let our Cleaning Specialists help you!

Complete details will be sent upon request.

"The name NORTHWEST means first with the best."

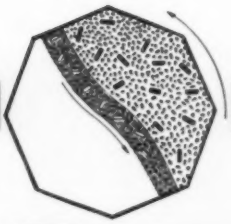
LO pH HI

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

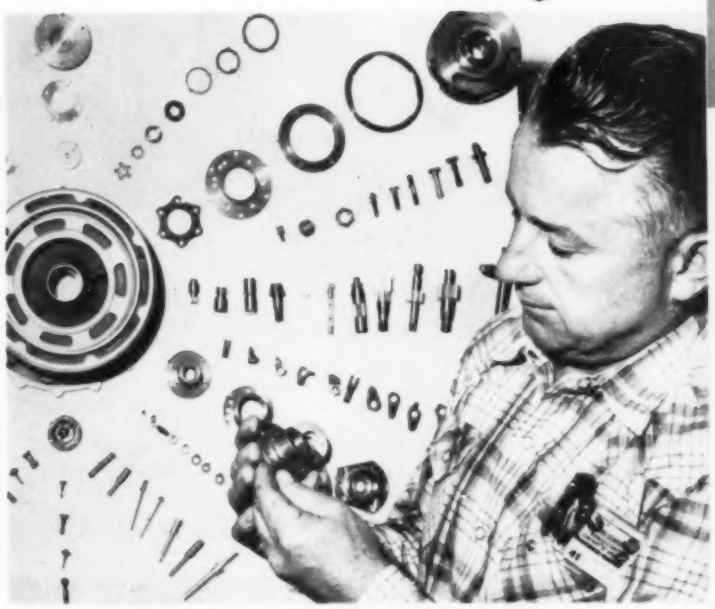
For more information circle No. 91 on the Reader Service Card

BARREL FINISHING



COMPARISON OF HAND FINISHING AND BARREL FINISHING PRODUCTION RATES

Finishing Method	No. of Pieces	No. of Workers	Time
Hand Finishing	12-14,000	82	6 days
Mechanical Finishing	30-60,000	6	5 days



SIZES AND SHAPES of parts which are successfully and efficiently made useable by mechanical barrel finishing are displayed above. These are similar to parts sent to Roto-Finish for testing.

MEDIA AND COMPOUND being poured into a barrel-finishing machine. Hoist carries loads to and from media bins.

How to Cut Costs, Labor, Time, & Part-Rejects

PROBLEM: *How to turn out a larger amount of finished parts each week; how to raise the standard of part-uniformity and tolerances — and keep it high!*

THE AiResearch Manufacturing Division of the Garrett Corp. supplies close-tolerance parts and materials to the aircraft industry. Because of this, precision-finishing parts of magnesium, bronze, aluminum, and steel is one of the most important operations done in the finishing department of their plant in Phoenix, Arizona.

It was obvious to the firm's production men that there was no possible answer to the riddle if old-fashioned, hand-operation methods were kept. An analysis showed all three shifts could only turn out as much as 14,000 pieces each week. This meant that the entire working force of 82 men must be kept on the job, around the clock, in order to hold the production rate at a figure which was still *too low*. Some other way of turning out precision parts would have to be found. But how? Where?

RESEARCH: *Testing all possible methods of finishing precision parts, evaluating results — and choosing the best!*

A sample selection of aircraft parts which took the most time to finish were sent to the Roto-Finish Co., in Kalamazoo, Mich. Some of these parts can be seen in the picture at upper left. The batch included several gear units and other parts that must be finished to exact tolerances. They were put through all the tests, completely analysed, and finishing recommendations were made.

SOLUTION: *Using barrel finishing to turn out ready-to-use parts which once took days — and cutting time to a few hours!*

Parts were returned and data gathered on time-cycles, additives, and loads, to be used as needed. Today, the AiResearch metal finishing department is completely mechanized. These four machines handle all metals and grind surfaces from a 5 to 12 finish: large-fixture, 18 cu.ft. capacity, 30″ x 36″, 8-door machine; 60″ x 36″ machine with four, 9 cu.ft. compartments; 36″ x 24″ 4-door, 10 cu.ft. capacity unit; and 26″ x 24″ unit with a total capacity of 11 cu.ft.

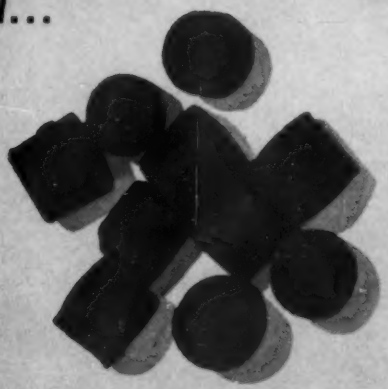
ADVANTAGES: *No scoring of smooth surfaces; Sharp edges and radius-corners finished; 50% less work on some materials; Total rejects are less than 17% of hand-made rejects.*

NEW...

ALUMINUM OXIDE TUMBLING NUGGETS

Fused Aluminum Oxide Tumbling Nuggets provide a fast cutting action for grinding, deburring, and polishing and require no breaking-in period. Their long wearing qualities help minimize the problem of lodging in parts. They are designed especially for precision barrel finishing.

NEW...



ALUMINUM OXIDE VITRIFIED TUMBLING PELLETS

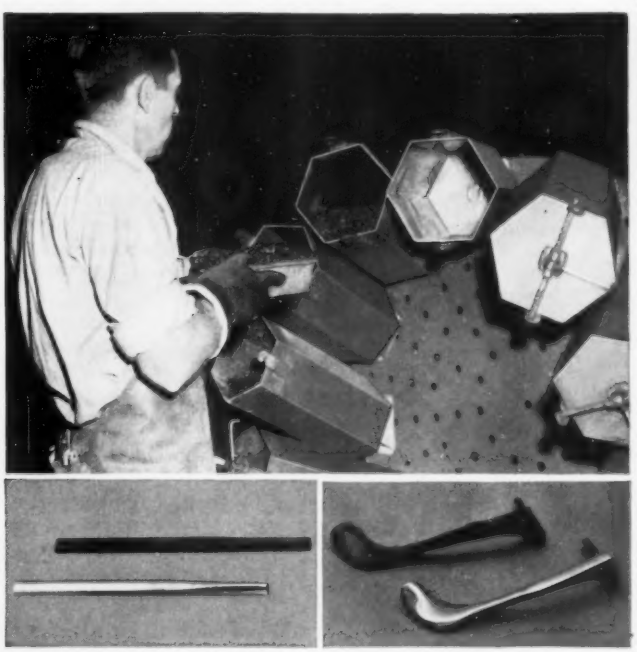
Aluminum Oxide Vitrified Tumbling Pellets are controlled bonded shapes manufactured under the same rigid quality standards as other bonded abrasive products. The grit, grade, and bond are precisely formulated to give maximum "cut" with minimum wear. They are particularly advantageous where lodging must be prevented and where a rapid rate of cut is desired.

NEW...PRECISION-CONTROLLED...

NEW...

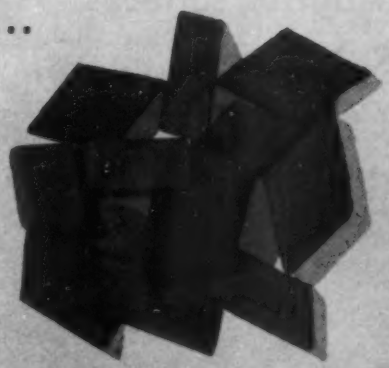
"CARBO-BRITE"

An electric furnace product having a fine crystalline structure and slow wearing qualities which adapt it to light burr removal and high finish operations where high color is desired. Its weight, somewhat heavier than nuggets, makes it specially suited for burnishing operations.



Typical Parts Finished with CARBORUNDUM *Tumbling Media Showing "Before and After" Illustrations.*

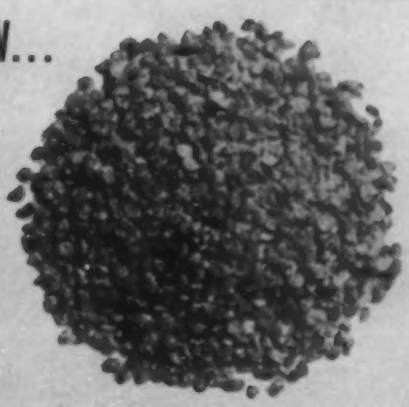
NEW...



"CARBO-RUBS"—RUBBER BONDED TUMBLING MEDIA

"Carbo-Rubs" are parallelogram-shaped rubber bonded tumbling media. They are used primarily where the burr is light and action must be gentle. Their most popular use is to prepare a surface for high "color" and remove burrs from non-ferrous parts.

NEW...



ALUMINUM OXIDE TUMBLING GRAIN

Aluminum Oxide Tumbling Grain is Fused Aluminum Oxide specifically designed for the most economical results in tumbling small metal parts. It may also be used as an additive to augment the cut of various other tumbling media. Coarser sizes are used in the new "spinner-type" finishing equipment. Available in a wide range of types and grit sizes.

...TUMBLING MEDIA

for all barrel finishing operations... deburring...

scale removal... polishing... honing... blending... burnishing

Faster, More Uniform Metal Finishing At Low Cost

Manufacturers of metal parts which require deburring, scale removal, polishing, honing, blending, or burnishing operations can now produce finer finishes *at lower costs* by using the new *precision-controlled* Tumbling Media by CARBORUNDUM. New improvements in the manufacture of abrasive media at CARBORUNDUM assure exceptionally high output per barrel with absolute uniformity of parts and finishes. Even unusual shapes and sizes can be mass-finished to precision tolerances... at a fraction of the time and cost... thanks to precision-controlled tumbling abrasives by CARBORUNDUM. CARBORUNDUM's wealth of abrasives 'know-how' is readily available to assist manufacturers in working out their specific parts finishing problems. Write for further information.

MAIL THIS COUPON TODAY

Write for this FREE Booklet A practical guide describing barrel finishing of metallic parts on a mass production basis using Tumbling Media.

THE CARBORUNDUM COMPANY
Dept. PM83-816
Niagara Falls, New York

Tell me more about "Precision-controlled" Tumbling Media.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

For expert advice... Ask the Man from

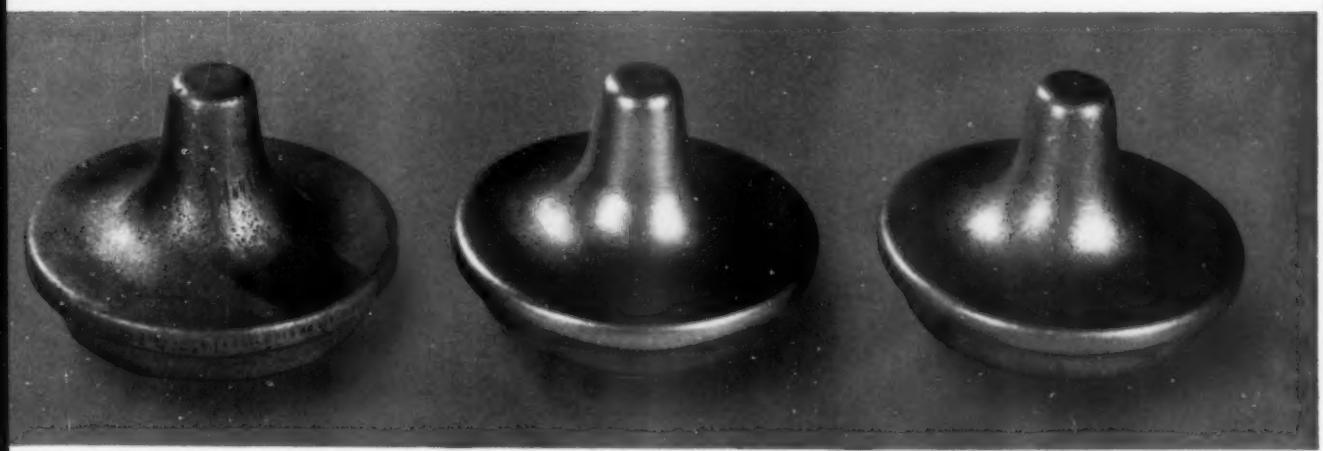
CARBORUNDUM

REGISTERED TRADE MARK

For more information circle No. 18 on the Reader Service Card

SINTERINGS

Barrel finishing with sintered media gives better surfaces, and cleaner parts.



BEFORE BARREL FINISHING, the die casting seen above has the usual appearance of a part before it has been processed. The characteristic "pits" and rough surface-areas are obvious. Barrel finishing will remove these, depending on the media used.

METAL POWDER MEDIA used as an abrasive during the barrel finishing operation produced this excellent finish on the die casting seen above. The surface has a soft sheen, and the tolerances held are well within the specified limits.

MEDIA WAS Al_2O_3 when this die casting was barrel finished. Since these three castings are photographed side-by-side in the same picture, it is obvious that all were grouped in the same light, that all are the same size and shape.

Metal Bonded Media For Barrel Finishing[1]

MOST barrel finishing operations utilize naturally occurring or synthetically produced nonmetallic media. Among the more commonly used materials are: limestone chips, granite chips, fused alumina stone, and specially formulated ceramics. About the only metallic media commonly used are steel balls and shapes.

While these materials do a thoroughly adequate job of finishing they showed some disadvantages in the finishing of precision aircraft components. This is true because fits and finishes in aircraft components are closer than in most other industries. Small holes that can stand only very small chamfers are common as are tiny channels which, if plugged, may require scrapping of an expensive part. Further, surface finishes finer than 20 micro-inches rms are common.

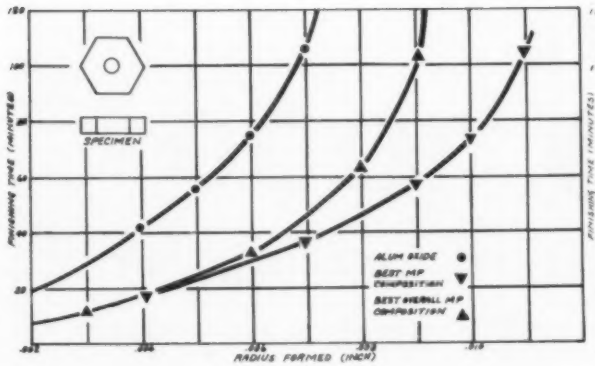
In barrel finishing these aircraft parts with normal media, lodging of media in holes and channels was common and only mechanical methods of dislodging them were possible. Generally this meant hand work. To secure the cutting action and the finish that were required meant careful control of media size. When fracture of the media occurred, and this was quite common, there was a loss of material.

The difficulties encountered in barrel finishing with standard media led to a critical evaluation to determine the characteristics of a suitable material. This study defined such a media as:

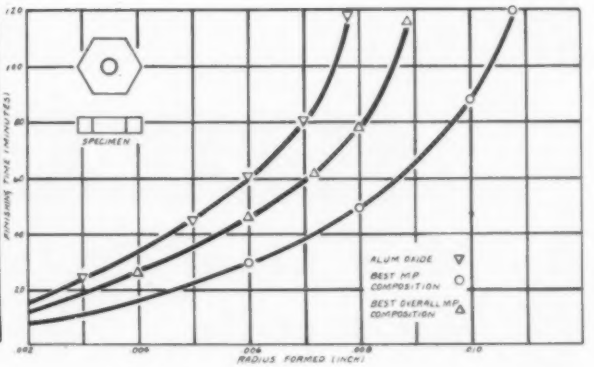
1. It must be easily removed from inaccessible areas.
2. It must have sufficient strength to resist fracturing during barrel operation.
3. It must have adequate wear resistance to give reasonable life in the barrel.
4. It must cut burrs and sharp edges rather than peen them over.
5. It must be adaptable to the multitude of materials used in aircraft parts.
6. It must be capable of manufacture within a reasonable cost.

It seemed that a media composed of a matrix with abrasive particles dispersed throughout it would provide a material which could be differentially attacked by a solvent inert to the material in the parts being finished. This indicates a metallic matrix.

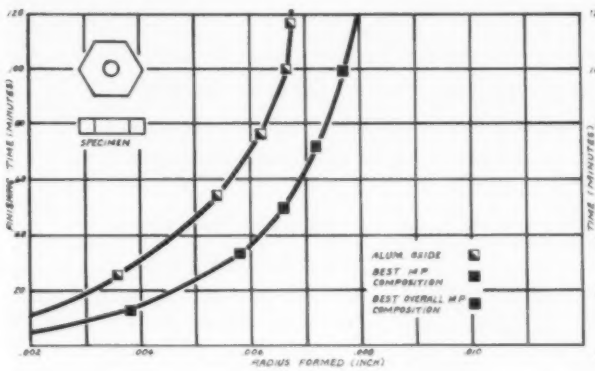
(1) From: Metal Powders For Barrel Finishing by G. C. Madigan. Paper presented at the 14th Annual meeting of the Metal Powder Association, April, 1958.



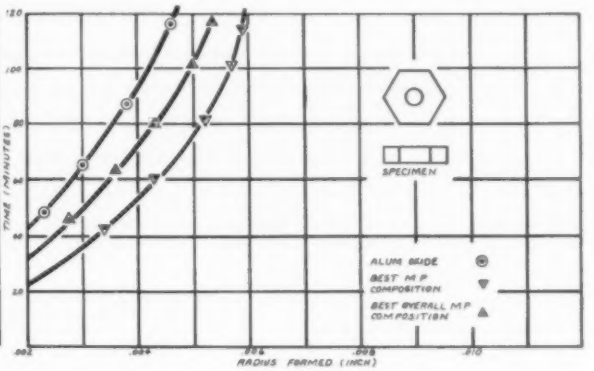
1. Cast 43 aluminum



2. Cast 356-T6 aluminum



3. Cast brass



4. Cast 440C stainless steel

THE ABOVE CURVES show the rate of radius formation on different materials commonly used for aircraft parts. In every case the sintered media is compared with aluminum oxide media. Two curves for sintered media are given; the rate with the best composition thus far developed and the rate with the composition found best for a wide variety of different metals and alloys. In the case of brass castings the best over-all composition and the best composition for brass were the same.

No commercially available material could be found which would meet the requirements. Experimental work was started to try and develop a suitable media. The first scheme tried was to tumble copper pellets in an abrasive so as to impregnate the surface of the copper with the abrasive. Pellets produced in this manner were unsatisfactory because of the rapid loss of abrasive from the matrix. However, the finishing results were encouraging; the synthetic media cut satisfactorily, lodged media were easily removed and there was little, if any, fracturing.

Casting of an abrasive-copper mixture was tried, but the pellets produced were not satisfactory. Finally a mixture of abrasive and copper powder was formed into pellets in a die and the resulting parts sintered. These pellets seemed suitable in every respect. When they lodged in holes or channels they were easily removed by dissolving them in a solvent that would not attack the metal from which the part being polished was made. There was no noticeable fracturing, rate of media wear was slow, rate of cut was rapid and the surface finish produced was satisfactory. It also appeared that the new media was forming small radii faster than before.

The early work also showed that there was no standard test procedure for evaluating barrel media. Some method had to be developed that would give a fast, accurate comparison of different materials. Test work showed that slugs cut from an hexagonal bar give the fastest and most reproducible results in different media tests.

The results of some of these tests, using hexagonal cross-section slugs are given in figures 1, 2, 3, and 4. In every case, the metal powder media is compared with aluminum oxide. Also, in every case a composition for the media was found that was the best for each particular material (called the best MP composition). From the different compositions studied it was then possible to select one composition that gave the best results when used for all materials (called the best overall MP composition). In the case of brass parts the best and best-overall MP compositions are the same.

From the curves the evident superiority of the metal powder to media to produce small radii is clear.

Introducing Allied's

IRILAC™ #1000

New Clear Protective Coating for All Metals . . . as safe and easy to handle as Water!

New method of protection incorporates corrosion inhibitors in a water-soluble polymer base. Dries to an extremely thin, tough, durable coating—clear in color. Does not chemically affect base metal or any post-treatments. Used as a protective treatment alone or to enhance value of post-treatments.

Allied's new Irilac #1000 is a concentrated solution of a water-soluble polymer with built-in complex corrosion inhibiting materials. It was developed to answer the needs of the metalworking industry for a non-conversion process that will provide corrosion resistance and resistance to fingerprinting and abrasion on base metals and electrochemically or chemically finished surfaces—without changing the appearance of the metallic surface.

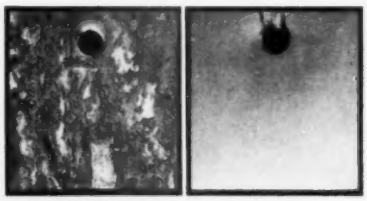
There are no hazards involved—Irilac is non-fuming, non-toxic, and requires no special fire prevention measures.

THE PROCESS

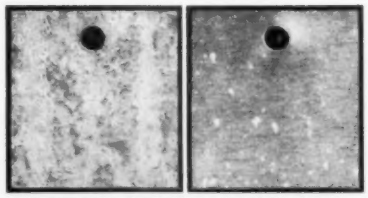
Irilac #1000 is diluted with water to provide a simple one-pass working solution. It is then applied by dip, brush or spray and forms a coating that quickly *bonds* to the metal surface without reacting with the surface.

THE PROPERTIES

The resulting coating is clear, transparent, thin yet durable. It has excellent water-resistant properties, and can be rubbed, handled and subjected to rough treatment. The surface to which Irilac has been applied is not altered—in fact, the transparent coating brings full tone to colored surfaces and clarity to iridescent surfaces. The water-thin physical characteristic of the solution means that the coating provides protection in recessed areas that are difficult, if not impossible, to protect with other methods.



STEEL PANELS: bare (left) and coated with Irilac (right) after 8-hour salt spray.



ALUMINUM PANELS: bare (left) and coated with Irilac (right) after 168-hour salt spray.

WHERE IRILAC CAN BE USED

Irilac #1000 can be applied to *any* metal—wet or dry—treated or untreated. All metals can be processed in *one* operation in the same solution. It can be applied in conjunction with any process—over Iridite, anodized, phosphated surfaces, black oxide, etc. Surfaces treated with Irilac provide a good base for paint.

APPLICATION ADVANTAGES

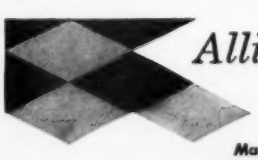
No other process or material available for the protection of metals offers all the application advantages found in new Irilac #1000:

1. It can be applied to any clean metal simply by dip, brush or spray. No special equipment is required.
2. Saves time—just apply and dry—no reaction time required.
3. No hazards involved—no exhaust or special fire protection equipment is required. Irilac is non-fuming and non-toxic.
4. Saves space. Presents no disposal problem. Low in first and final costs.

Because of its versatility and complete safety, Irilac has unlimited uses. For example, it will protect aluminum furniture, brass hardware and fixtures, steel parts of all types, zinc castings, etc. In fact, any base metal or plated surface, or those treated with electrolytic or chemical post-treatments, can be improved or enhanced with Irilac.

IRILAC #1000 MAY BE THE ANSWER TO YOUR PROTECTION PROBLEM

Our development staff will be glad to work with you to determine the significant benefits Irilac can offer you. Simply send us some parts and let us show you what Irilac can do. No obligation, of course.



Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET
BALTIMORE 5, MARYLAND

***Manufacturers of* IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals — West Coast Licensee: L. H. Butcher Co.**

For more information circle No. 85 on the Reader Service Card

CASTING ABOUT

continued from page 10

MAGNESIUM-THORIUM ALLOY, Lighter and stronger than either aluminum or magnesium, it is also very soft. The alloy, created for use in missile work where every ounce saved means less fuel to be carried, needed a harder surface for the widest possible use. Now the Bettinger Corp., has announced a ceramic coating to be applied on the alloy that seems to offer a solution to the problem of softness.

Ceramic coatings as little as 0.001" to 0.002" in thickness are reported to improve the tensile strength of the alloy and to increase the resistance to abrasion, corrosion and erosion. High temperature strength is improved also.

The coating was developed by Bettinger for Convair as a part of their general missile development program.

DIE CAST ALUMINUM ENGINE BLOCKS may seem a long way in the future to some people, but DuPont's petroleum laboratory thinks it's close enough to start performance testing. An all aluminum test engine has been installed to check performance of all types of gasoline and oil additives in these light weight power packages. The engine is a four cylinder model that duplicates a companion test unit of conventional cast iron and steel. It will provide both the oil and the motor industries with comparative performance and combustion data. A further development that DuPont sees is the development of new fuels or fuel blends.

New Appointments at Oakite Products, Inc.

BALTZELL

BREMER

Two major staff appointments have been announced by OAKITE PRODUCTS, INC. William A. Baltzell, industrial sales manager, and Dr. Clarence Bremer, technical director for the company.

For more information circle No. 61 on the Reader Service Card

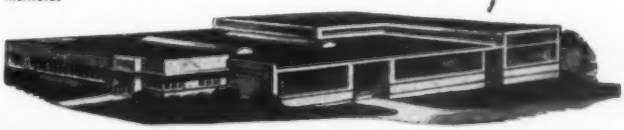
Get the results you want from DIE CASTING...

A partial list of RESULTS you can expect when you specify MILWAUKEE DIE CASTINGS
★ Less Machining
★ Improved Design
★ Closer Tolerances
★ Smoother Finish— at lower cost
★ Stronger Sales Appeal
★ Faster Assembly

When you decide to use die cast parts, you expect, definite *results* in terms of *benefits* reflected in your manufacturing operations, or in your finished products. Milwaukee engineers and technicians, backed by the complete facilities of the modern Milwaukee plant, are qualified by training and experience to give you the results you are looking for... and more!

When you send your prints and "specs" to Milwaukee, you often get more than a quotation. You may get suggestions and proposals, when deemed useful, that will give you all the results you are looking for plus the *extra benefits* which the die casting process can give you.

Milwaukee operates under the Certified Zinc Plan of the American Die Casting Institute.



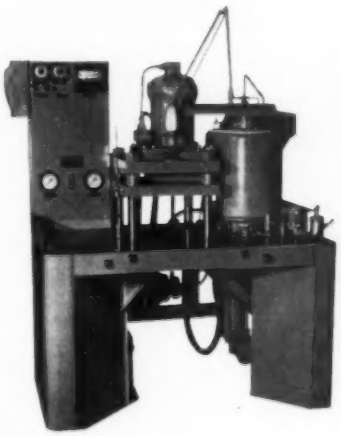
MILWAUKEE DIE CASTING COMPANY

4146 N. HOLTON STREET • MILWAUKEE 12, WISCONSIN

Established 1909

LEYDEN WAX INJECTORS

Completely Hydraulic • Three Models Available



Over 200 machines in the field have proved their superiority. Write for complete specifications and features of the Leyden Models vertical platen—side or center injection—horizontal platen—center injection.

LEYDEN wax injection machines are the last word in the field of wax injection. They are the result of years of research and experience.

SOME EXCLUSIVE FEATURES

- Completely hydraulic—operated by self-contained power unit.
- Two hydraulic pumps—one for clamping and one for injection.
- Clamp and injection pressure independently adjustable.
- Entire wax unit heated by circulating oil.
- Thermostatically controlled, electrically heated nozzle—optional.
- Temperature controlled to plus or minus ½° F.
- Agitator spans full diameter of the pot, keeping wax mixed uniformly.
- Universal movement of nozzle to facilitate misaligned dies.

LEYDEN HYDRAULICS, INC.

1800 North River Road • Melrose Park, Illinois

For more information circle No. 54 on the Reader Service Card

DO YOU NEED BETTER METAL CLEANERS FOR THESE JOBS?

All the tough jobs are covered by Oakite's booklet on *"Cleaning and preparing metal in aircraft production"*. Just check this list of contents for reminders of operations that give you trouble:

	SEE PAGES
☐ Cleaning aluminum (with or without etching)	2
☐ Preparing aluminum for welding	3
☐ ChromiCoating aluminum before painting	4
☐ Stripping paint from aluminum, steel	5, 9
☐ Barrel finishing aluminum, steel, copper	5, 9, 11
☐ Cleaning magnesium	6
☐ Cleaning steel; derusting and descaling	7
☐ Preventing rust	8
☐ One-operation preparation for painting	9
☐ CrysCoating steel before painting	10
☐ Cleaning copper and its alloys	11
☐ Controlling water in paint spray booths	12

FREE For your copy of this 16-page illustrated booklet, write Oakite Products, Inc., 25A Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

In our 50th year

Technical Service Representatives in Principal Cities of U. S. and Canada

Export Division Cable Address: Oakite

For more information circle No. 92 on the Reader Service Card

DATA IN ADS

continued from page 64

72. Sinterings Savings—A brochure entitled, "How to Cut Precision Parts Costs with the Remet Powder Metal Process", is available from Reese Metal Products Corp.

73. High Strength Powder—Technical data is available on Type 6460 high strength powder that has minimum tensile strengths at 6.4 density of 60,000 p.s.i. as sintered, and 100,000 p.s.i. heat treated. Republic Steel Corporation.

76. Stainless Steel Ladles & Skimmers—which are 75% lighter than cast iron and have extremely long life are described in literature offered by Spincraft, Inc.

79. Furnaces—Specification charts, cutaway drawings, a complete detailed illustrated listing of products; these are just a few of the features in the 36-page catalog offered by Stroman Furnace & Engineering Co.

80. Fire Prevention Data—A new booklet entitled, "Ucon Hydrolubes Spell Safety", gives all the facts on these fire-resistant fluids, which eliminate the common fire hazards connected with hydraulic operations. Union Carbide Chemical Co.

81. Die Steel—A descriptive brochure is available on Thermold AV die casting die steel from Universal-Cyclops Steel Corp.

82. Die Casting Facilities—A brochure, prepared by the Paramount Die Casting Co., describes the company's facilities for making specialized die castings.

83. Investment Castings—of magnetic alloys are being produced by Westinghouse Electric Corp. Complete details on facilities for supplying small quantities of prototype parts or production runs are available.

88. Drilling & Tapping Heads — Literature describes "Knuckle-heads", that are fully adjustable for multi-hole drilling and tapping. Ettco Tool & Machine Co., Inc.

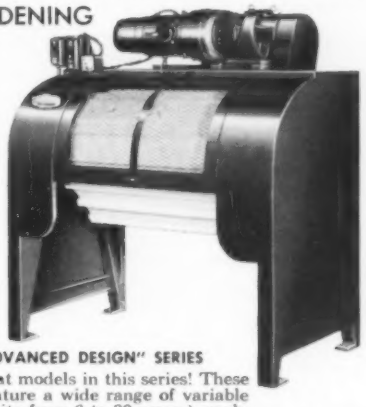
92. Metal Cleaning—All of the tough jobs in metal cleaning are covered in a 16-page booklet entitled, "Cleaning and Preparing Metal in Aircraft Production". Oakite Products, Inc.

95. Hydraulic Presses—Technical information is available on the company's fast trimpress that requires only 3 HP. The unit needs only a minimum of floor space and is available in 2 & 4 post models.

FOR DEBURRING • DESCALING • GRINDING • BURNISHING • POLISHING • FORMING RADII
MICROINCH FINISHING • RUST-INHIBITING • WORK-HARDENING

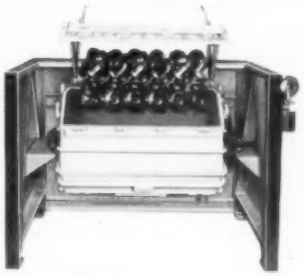
ALMCO

has the right barrel finishing equipment for you!



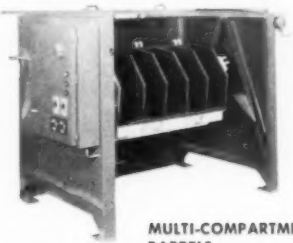
ALMCO'S "ADVANCED DESIGN" SERIES

Thirteen great models in this series! These machines feature a wide range of variable speeds (infinite from 6 to 30 r.p.m.), making possible economical deburring and finishing of the greatest variety of parts. Each unit has Almco's exclusive design features and rugged construction to stand up under all types of punishing applications.



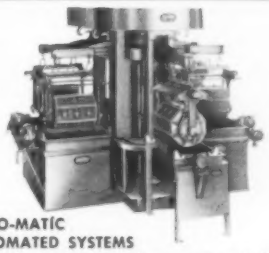
"FIXTURE" TYPE BARRELS

Pioneered by Almco for processing large and intricate parts. Custom designed fixtures hold parts securely, prevent part-on-part impingement and allow abrasive action to reach all surfaces, cavities, slots, etc. Barrels have automatic forward and reverse controls. Almco also offers integrated materials handling systems for further barrel finishing economies.



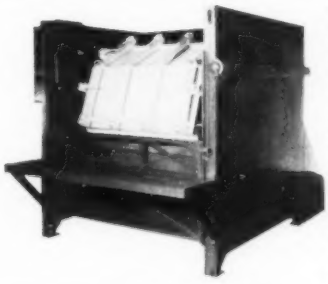
MULTI-COMPARTMENT BARRELS

Do you have these deburring and finishing problems — wide variety of parts or small quantity runs where fixtures would be too costly? Or short to medium cycle runs where you could *re-use* compound for several runs? Lack of floor space for several machines? An Almco custom-designed multi-compartment barrel may give you a cost-saving answer. Automatic forward and reverse. Any combination of compartments and doors.



SUB-O-MATIC AUTOMATED SYSTEMS

Almco's exclusive submerged unit is an automatic, "assembly line" system for micro-precision deburring and finishing of small parts in quantity. Saves labor, speeds up processing and flow of high production parts. One man for example can operate this equipment and handle as many as 192 barrel loads per 16 hr. day. Slashes compound expense to minimum because compounds can be re-used for days at a time. These submerged systems can also be obtained in non-automated, straight line systems.



CUSTOM-DESIGNED BARRELS

Almco designs and manufactures special barrels of all types for problems where standard equipment cannot be effectively used. These range from the smallest type to the largest fixture barrel such as the 60" diameter x 60" length barrel shown above. Special large diameter barrels with double flat or triple flat doors are also available to accommodate extra large parts and to allow abrasive media to flow freely over the outer periphery of the part. Your special problems may be solved with one of Almco's custom-designed barrels. Material handling systems can also be closely coordinated with special barrels.

YOUR SAMPLE PARTS PROCESSED without obligation in this modern Almco test lab! Simply write on letterhead for address of nearest Almco lab or send parts direct to Albert Lea, Minn. Enclose specifications desired. Complete free report includes recommendation. 52 PAGE BARREL FINISHING HANDBOOK SENT ON REQUEST.

Almco deburring and finishing machines are ruggedly constructed to perform on a round-the-clock basis. They incorporate the best engineering design required in the industry — your assurance of versatility and economical processing of work parts. Optional equipment includes material handling devices and systems, automatic forward and reverse, double or triple flat doors, single and dual timer controls for automatic delay starting and stopping, perforated drain doors for flushing and rinsing, unloading devices, etc. Also a full and complete line of Almco Supersheen barrel finishing compounds and media of all types made especially for use with Almco precision barrel finishing equipment.

SMALLER MACHINES

Twin barrel machines manufactured by Almco are the standard of the industry for shops processing small lots of parts and for companies with large lots of small parts. Also ideal for sample processing, barrel finishing research and development work, and as auxiliary equipment. These units are Almco engineered to the highest specification standards and include operational and safety features found on larger Almco machines.

ALMCO

QUEEN PRODUCTS DIVISION
KING-SEELEY CORPORATION
79 Marshall Street • Albert Lea, Minnesota

Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia and London, England.

Designers and Builders of all types of Barrel Finishing Equipment for the Metalworking Industry

For more information circle No. 86 on the Reader Service Card

CHOOSING A FINISH

continued from page 69

that obtained by zinc plating. Zinc plating in common with other electroplated finishes does not deposit uniformly in recesses. This may leave appreciable areas without adequate protection.

Chemical polishing and the accompanying passivation reaches all areas uniformly and the durability may exceed that of chromated zinc plate by as much as 2 or 3 to 1. Again, clear lacquers are a valuable supplement for increasing protection and for providing wear resistance that is satisfactory.

Copper plate, column 7, is more easily applied to die castings than nickel plate since the part itself is less subject to chemical attack by the plating bath. A copper thickness of .0002" to .0004" is desirable since copper can diffuse into the surface of the die casting at ordinary room temperature.

If all of the copper plate were to diffuse into the zinc, the adhesion of the subsequent nickel and chromium deposits would be affected adversely. Most of the nickel plating used in these operations produces a bright plate which needs no buffing and which has good leveling power for obscuring small surface imperfections, such as lines produced in buffing.

Nickel plating solutions for plating directly on the die casting are available but these generally produce brittle deposits which are not very bright. Nickel plate alone, column 9, may be used as a final finish or it may be followed by brass plate, column 8, or a chromium plate, column 10.

Chromium plating is kept to a thick flash plate of .00002. This prevents tarnishing of the nickel deposit and provides a high degree of wear resistance.

When the surface of the die casting is of high quality and the trimming operation is close enough to eliminate the necessity for grinding or polishing, chemical polishing may be substituted for buffing at a saving in cost.

After bleaching, the parts can be returned to the conventional plating cycle. The final finish after chromium plating varies slightly in texture from that produced on a buffed die casting. But the luster is acceptable for most decorative applications.

CONCLUSION

Economy in the finishing of die castings depends on two things:

1. Choice of finish which will meet appearance and durability requirements without unnecessarily exceeding them.
2. Designing, manufacturing, and handling in such a manner as to minimize the number of finishing operations required.

Table I provides additional data on the various finishes which should also be considered.

REFERENCES

1. *Beckwith.* "Requirements of Zinc Base Die Castings for Electroplating." AMERICAN ELECTROPLATERS' SOCIETY ANNUAL PROCEEDINGS, 1951.
2. *Goodman & Castle.* "Barrel Finishing Methods." ELECTROPLATING ENGINEERING HANDBOOK. REINHOLD, 1955.
3. *Caldwell.* "Mechanical Polishing of Zinc Base Die Castings Prior to Electroplating." A.E.S. PROCEEDINGS, 1951.
4. *Arnold.* "Chemical & Electrochemical Preparation of Zinc Base Die Castings for Electroplating." A.E.S. PROCEEDINGS, 1951.
5. *Pocock.* "A Survey of Chromate Treatments." METAL FINISHING, Dec. 1954 and Jan. 1955.

The NEW Hammond FLAT-FINISHER

WILL HELP YOU SOLVE YOUR FLAT FINISHING PROBLEMS

AVAILABLE IN 6" — 7" — 8" SIZES WITH SINGLE OR MULTIPLE HEADS

OTHER MODELS TO 12" ALSO AVAILABLE

Fast, uniform finishing of flat parts!

Grind and polish metal or plastic parts in one semi-automatic operation! Where high production and consistent finishes are required, look for these Hammond features:

AUTOMATIC AIR TENSIONING: maintains correct tension on abrasive belts and conveyor belt.

VARIABLE SPEED CONVEYOR: rate of feed is adjustable from 0 to 60 FPM.

WORK HOLDERS: hold-down rolls, electro-magnetic platen and various types of conveyor belts.

AMMETER CONTROL: an ammeter for each head allows operator to determine and maintain the polishing pressure necessary for a uniform finish and longer belt life.

V-BELT DRIVE: allows abrasive belt speed to be changed to suit the work.

TYPICAL PARTS FINISHED WITH THE FF-6

Send samples and production requirements for an engineering report on your finishing job.

Hammond Machinery Builders INC.

1642 DOUGLAS AVE. • KALAMAZOO, MICHIGAN

SEE US NAT'L METAL EXPOSITION — BOOTH 1250 — OCT. 27-31

For more information circle No. 89 on the Reader Service Card

New Field Manager For Reed-Prentice

JAY D. SHERMAN

Jay D. Sherman has been named field sales manager of the REED PRENTICE DIV., PACKAGE MACHINERY CO. Sherman was appointed district manager for Reed-Prentice in 1950 and eastern sales manager last year. In his new position, Sherman will be supervisor of sales for die casting machines and plastic molding machines for all eight branch offices throughout the country.

New Officers Announced By Allied Research

As a result of the merger of Wagner Brothers and ALLIED RESEARCH PRODUCTS, INC., new officers have been announced. They are: H. C. Irvin, president; J. A. Cairns, vice president; F. M. Mansfield, vice president; Harry C. Quast, Secretary; and Joseph W. Agerson, assistant secretary.

As a result of the merger, all metal finishing operational assets and products of Wagner Brothers have been acquired by Allied Research. Wagner Brothers, Inc., will continue to exist, but will neither manufacture nor market any product for the metal finishing industry.

Electronicast Div. Adds Staff Members

NILSEN MFG. CO., has announced new staff appointments in the ELECTRONICAST DIV., Henry A. Hycner, has joined the sales department; Casimir Biedzinski, former chief tool engineer for Admiral, will be in charge of tool engineering and tool production; Raymond Robbins, from Ford Aircraft, will be in charge of the inspection and quality control.

HIS JOB

....TO BUILD YOUR PROFITS!

THE *Roto-Finish* CUSTOMER'S MAN

There's nothing unique about stressing product quality. But, at Roto-Finish we have an added incentive. The success of the Roto-Finish Customer's Man *depends* on providing the kind of dependable, mass-production finishing service which builds customer satisfaction, and results in a steady repeat business.

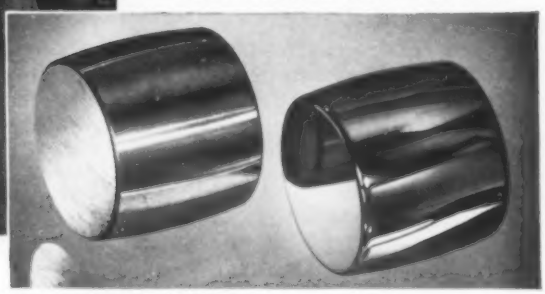
TRIAL AND ERROR FINISHING IS COSTLY

If you're now barrel finishing, our Customer's Man will welcome an opportunity to work with you in your own plant to show you how to get the finish you want, faster, and at lower cost.

If you're hand finishing, he can show you how to save up to 80% of your present finishing costs.

WANT PROOF? Then write or phone your Roto-Finish Customer's Man today.

ROTO-FINISH CASE HISTORY



*This photo is unretouched.

MATERIAL: Bearing steel, 61 Rockwell C Scale.
DIMENSIONS: 1.213" dia. x 1.015".
FINISH BEFORE: Ground to 10 RMS.
FINISH AFTER PROCESSING: 2 to 4 RMS,
(with no dimensional change).

Roto-Finish COMPANY

3716 Milham Road
KALAMAZOO, MICHIGAN
Phone: Fireside 3-5578

ROTO FINISH

FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd.—Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Hanson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd.—Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● SPAIN—Instituto Electroquimico, S. A.—Barcelona

For more information circle No. 93 on the Reader Service Card

USEFUL LITERATURE, CATALOGS, MANUALS

any of these technical publications may be obtained by circling the appropriate numbers on the Reader Service Cards, Pages 64-65

PROCESSES

Investment Casting: 154

NATIONAL PRECISION CASTING CORP.—A new, illustrated brochure presents the new look at National. The company's new plant is shown in a graphic presentation and the company's new policy of customer satisfaction is explained.

Permanent Mold Casting: 155

MONARCH ALUMINUM MFG. CO.—"Manufacturing Achievements in Molten Aluminum", is the title of a brochure describing the company's manufacturing achievements in aluminum permanent mold castings and aluminum and certified zinc die castings.

Welding Aluminum: 156

REYNOLDS METALS CO.—"Different . . . Not Difficult", is the title of a booklet on the welding, soldering and brazing of aluminum. The basic fundamentals of these processes, used in the joining of aluminum, are found in the book's 25-pages.

Shell Mold Castings: 157

GENERAL ELECTRIC CO.—The G-E foundry facilities for producing precision castings by lost-wax molding, shell molding, permanent-mold, die casting, and sand casting are presented in a recent 15-page brochure.

Sinterings: 158

METAL POWDER ASSOCIATION—The 1st issue of the Powder Metallurgy Quarterly discusses the "Use of Powder Metallurgy Gears"; the technical trend in prealloyed steel powders; and engineering data on "Infiltration . . . For High Strength", a discussion on the properties of infiltrated iron powder parts.

Investment Casting: 159

ALLOY STEEL CASTING CO.—Catalog 201 discusses the company's complete facilities for Investment Casting and the advantages of the process. Literature is also available on the production of high quality stainless steel castings through sand casting.

Investment Casting: 160

MISCO PRECISION CASTING CO.—A new monthly, "Casting About with MISCO", presents the latest news and developments in the industry.

Investment Casting: 161

MERCAST CORP.—"How To Buy Investment Castings", a helpful article on the significant evaluation factors for judging investment castings and selecting casting supplies, is available.

MATERIALS & EQUIPMENT

Flowmeters, Automation Equipment: 162

FISCHER & PORTER CO.—Facilities booklet describes the diversified products of the company: flowmeters, process instrumentation, data reduction, automation equipment, etc.

Heat Treating Equipment: 163

C. I. HAYES, INC.— Literature describes the company's laboratory facilities and their experience in the manufacture of heat treating equipment.

Dehumidification For Industrial Plants: 164

ABBEON SUPPLY CO.— Bulletin No. 512 presents "1958-1959 Facts About Dehumidification for Industrial Plants, Warehouses, Stockrooms and Laboratories and Home Requirements". The latest equipment for measuring humidity and for dehumidifing various sized areas is shown.

Self-Lubricating Bearings: 165

HALLER, INC.—Literature describes a new hollow cavity bearing. This sintered metal bearing will withstand high loads, yet it contains a reservoir of lubricant equal to about 35% by volume.

High Frequency Motor-Generator: 166

GENERAL ELECTRIC CO.—Information is available on a new vertical high frequency motor-generator set designed for foundry melting, forging, vacuum heating, experimental research and other applications.

Solid Film Lubricant: 167

HOHMAN PLATING & MFG. CO.— Surf-Kote M-1284, a matrix-bonded solid, dry film lubricant, containing molybdenum disulfide, is described in a recent bulletin. It utilizes a new metallic bonding principal that increases the number of possible applications.

New Metal-Ceramics: 168

HAYNES STELLITE CO.— A 12-page booklet contains the physical, mechanical, and chemical properties, and typical applications of new cermets that show definite promise in the area of high-temperature service. They are now in use at temperatures to 2800 F.

Iron Powders: 169

EASTON METAL POWDER CO.—A data sheet is available on Easton RZ-365 Iron Powder which is available in many forms including a phosphorus grade and also in apparent densities up to 2.9 g/ccm before the addition of a lubricant.

Magnesium: Advantages, Applications: 170

WHITE METAL ROLLING & STAMPING CORP.—A booklet describing the properties, uses, applications and advantages of magnesium. It is specifically for engineers, designers, manufacturers and users. The Booklet gives details on magnesium's machineability, lightness of weight, weldability, design efficiency, etc.

High Vacuum Booster Pumps: 171

GENERAL VACUUM CORP.—Information is available on a new Series 450 Mechanical Booster Pump in standard sizes from 230 to 12,000 cubic feet per

minute. The lobe-type pumps have high pumping speeds over the range of 1 to 10 microns.

Coil Springs Handbook:
CRUCIBLE STEEL CO. OF AMERICA—The Heavy Duty Coil Springs handbook includes mathematical data and charts to aid buyers and users of coil springs develop springs to meet exacting specifications. This 48-page book is available by writing on company letterhead to: Crucible Steel Company of America, Spring Div., Box 2518, Pittsburgh 30, Pa.

Silicones Data Sheet: 172
UNION CARBIDE CORP.—The properties, advantages, and effective working concentrations of three silicone parting agents for the shell molding industry. The three are: LE-460 Silicone Emulsion; LS-46 Silicone Solution; L-46 Silicone Oil.

Solid Film Lubricant: 173
HOHMAN PLATING & MFG. CO.—Bulletin SL-122 describes Surf-Kote H-108, an easily applied, solid, dry film lubricant, containing molybdenum disulfide and utilizing a resinous bonding agent.

Excess Temperature Protective: 174
ILLINOIS TESTING LABORATORIES, INC.—Literature describes the Alnor Pyrotac, an excess temperature protective device that will sound an alarm and/or shut down upon reaching the safe maximum temperature.

High Temperature Pusher Furnaces: 175
C. I. HAYES, INC.—Bulletin No. 463 describes the company's BA type Pusher Furnaces with ceramic heating elements for temperatures up to 2400 F. The furnaces are widely used for sintering of powder metal parts.

Zinc Die Castings: 176
GRIES REPRODUCER CORP.—A recent bulletin describes the company's zinc alloy die castings for clothing, leather goods, accessories, and jewelry.

Government Specification Products: 177
E. F. HOUGHTON & CO.—A 12-page bulletin lists rust preventives, lubricants, metal working processing aids, fire-resistant hydraulic fluids, and hydraulic packings that are supplied to meet government specifications.

Extrusion Presses: 178
SUTTON ENGINEERING CO.— Bulletin 50 presents the company's line of extrusion presses that are available in all sizes for tubes, shapes and bars of aluminum, steel, brass, magnesium, copper, zirconium and other modern metals and materials.

Automatic Shell Molding: 179
T. B. WOOD'S SONS CO.— Bulletin No. 1102 presents the company's complete shell molding foundry. Illustrated is their automatic shell molding and handling equipment.

Iron Powder: 180
PLASTIC METALS DIV., NATIONAL-U.S. RADIATOR CORP.— Plast-Iron Grade B-261, developed for use in the

continued on page 84

Only Pennies Per Part

With The New Precision Minicast Process

...the unique process that beats the cost of other precision production methods ...at no sacrifice in quality

■ Now, the Minicast process, for the first time, successfully combines the basic advantages of the investment casting process with those of such other precision methods as coining, cold forming, screw machine production, and the like.

Miniature Minicast parts can be produced in nearly all castable metals and alloys, with dimensional tolerances as close as plus/minus 0.001″ per inch, cross-sectional thickness as low as 0.020, exceptional surface finish, and complex configurations . . . at production runs up to 50,000 per day.

And for the first time, with the Minicast process, these design features are possible at *only pennies per part.*

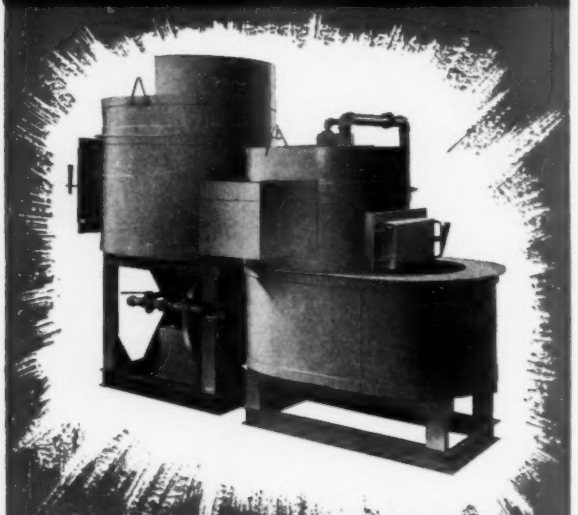
Get the complete story . . . Write for this new descriptive brochure . . . It's free of course.

ENGINEERED PRECISION CASTINGS

Casting Engineers, Inc.
2323 NORTH BOSWORTH AVENUE
CHICAGO 14, ILLINOIS

For more information circle No. 20 on the Reader Service Card

HERE'S ANOTHER NEW ONE!



Stroman "DC" Cylinder Type Furnaces for Combination Melting and Holding Aluminum with CONTAINED COMBUSTION BURNERS

For Die Casting, Permanent Mold and Sand Casting Operations

"Versatility Plus" is the keynote of these newest Stroman Contained Combustion Furnaces. They are absolutely new in design for they incorporate Contained Combustion Burners which eliminate direct flame impingement on the metal. They also make for cooler working conditions because of less heat loss. They give greater fuel economy for less BTU input is required . . . Longest refractory life and least maintenance due to mild combustion conditions . . . Uniform heating condition and improved metal temperature control assure lowest metal losses.

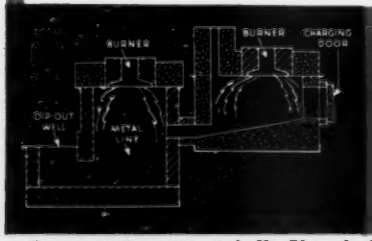
They are easy to charge and readily adaptable to automatic charging. Handling from 450 to 1600 lbs. per hour break down capacity with holding capacity from 600 to 2400 lbs., they will melt metal faster and more economically, and at the same time produce only the highest quality metal.

Roof of the furnaces are easily removed for furnace cleaning, relining, repair or burner service, as burner is mounted in the roof.

These Stroman "DC" Cylinder type furnaces are available in break down and holding combinations. However separate break down and holding units can be purchased. Break down units are often used to augment iron pot, electric and crucible furnace capacities.

Their flawless operation and ability to deliver years of trouble-free operation stamp them as a leading Stroman Aluminum production furnace. Investigate their cost cutting operation today.

Send for complete new catalogue No. 150 just off the press.



STROMAN
FURNACE & ENGINEERING CO.
FRANKLIN PARK
ILLINOIS

For more information circle No. 79 on the Reader Service Card

USEFUL LITERATURE

continued from page 83

fabrication of sintered compacts, is presented in Bulletin No. 3. Strength and growth properties, with and without copper and graphite are included.

Conveyor Furnaces: 181
C. I. HAYES, INC.—Literature describes conveyor furnaces that feature variable speed electronic drive, automatic temperature controls, and sinuous wound ribbon type heating elements.

Heat Treating: 182
FERROTHERM CO.—"Heat Treatments in Atmosphere Furnaces" is the title of a data log on protective atmosphere furnace annealing, and brazing and hardening. Protective atmospheres are also covered.

High Vacuum Valves: 183
VACUUM RESEARCH CO.—Catalog Sheet VG-5, Data Sheet VG-4 and Price List V-3, are available on the company's VG series high vacuum valves.

Wax Injection Presses: 184
ALEXANDER SAUNDERS & CO.—Bulletin WP58 furnishes complete data and specifications on the company's complete line of wax injection presses for wax pattern making in Investment Casting.

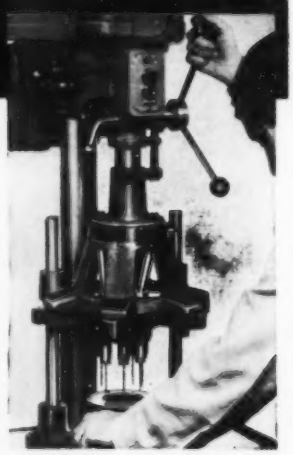
Locating Rings: 185
DETROIT MOLD ENGINEERING CO.—The June-July issue of the DME News discusses new standard locating rings for plastic injection molds. Specifications and prices are given.

ETTCO-EMRICK

K nuckle-heads

fully adjustable for dependable multi-hole drilling and tapping

5 models to choose from — circle or straight line types



- Chrome nickel universal ball joint type spindles.
- Adapt to any drill press or drilling or tapping unit or machine — Operate in any position.
- Quickly convertible for either drilling or tapping on any drill press.
- Lubricated ball joints with neoprene covers — an Ettco exclusive.
- Tap or drill capacities up to ⅝" in steel.
- Precision built, lightweight and compact.
- Unconditionally guaranteed for workmanship, material and performance.

Write for complete details today . . .
Buy them from your Ettco Distributor

Ettco-Emrick

ETTCO TOOL & MACHINE CO., INC.
586 Johnson Avenue, Brooklyn 37, N. Y.
Chicago • Detroit • Los Angeles • Indianapolis • Hartford

For more information circle No. 88 on the Reader Service Card

FINISHING

Acid Copper Plating: 186

AMERICAN BRASS CO.—A reprint of the article, "Alloy Anodes for Acid Copper Plating" by David A. Cutler, is available along with information on the company's Plus-4 Anodes.

Buff Fabric Impregnant: 187

AMERICAN BUFF CO.—Information is available on "Black Treatment", a system for impregnating buff fabric that increases strength and endurance and permits longer runs at lower cost.

Spring-Clamp Cathode Hook: 188

BELKE MFG. CO.—Literature is available on a new spring-clamp cathode hook, that provides positive contact pressure between the cathode rod and cathode hook, necessary for effective plating.

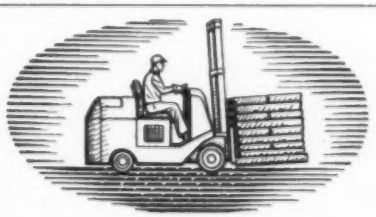
Barrel-Finishing Equipment: 189

LORD CHEMICAL CORP.—Bulletin No. 158 Describes the full line of "Lorco" equipment for precision barrel finishing. This includes conventional horizontal octagonal barrels and the new Lorco vibrator.

Barrel Finishing Compounds: 190

ALMCO, DIV. QUEEN PRODUCTS, INC.—Information is available on five new Supersheen barrel finishing compounds, No. 407, 408, 410, 412 and 501R. They cover processing needs including brightening, grinding, deburring, burnishing and inhibiting rust.

continued on next page



Ready to Deliver Highest Quality

Smelters Aluminum Alloy

For die casting, permanent mold casting and sand casting. Our alloys are rigidly controlled to meet the most exacting specifications.

- **We also produce hardeners in ingot and shot form for use in zinc base die casting alloys.**
- **We are also distributors of**

KAISER ALUMINUM ALLOYS

General Smelting Company

2901 EAST WESTMORELAND ST., PHILADELPHIA 34, PA.

For more information circle No. 41 on the Reader Service Card

HOW CAN BRASS POWDER METALLURGY HELP YOU?

BY MAKING PRECISION PARTS . . . AT QUANTITY COSTS

The biggest single factor favoring the use of powder metallurgy is economy. Within design limitations, the process is one of the lowest cost mass production methods —even for relatively small quantities of high quality precision parts.

Brass powder metallurgy has many advantages which contribute to economy of the process:

- . . . ***low scrap loss***
- . . . ***high dimensional accuracy***
- . . . ***controlled mechanical properties***
- . . . ***uniformly high quality***
- . . . ***savings in assembly time***

A powder metal fabricator can show you how brass powder metallurgy will produce precision components at low cost for your products—along with many other advantages.

THIS BOOKLET

will assist you in evaluating this modern production method in terms of your particular needs.

SEND FOR YOUR COPY

THE NEW JERSEY ZINC COMPANY

160 Front Street, New York 38, N. Y.

For more information circle No. 67 on the Reader Service Card

4 reasons foundries specify...

acf

REFAX® POTS

1 RETAINS HEAT: low nickel-chromium alloy cast iron absorbs heat fast, holds it with minimum reheating.

2 LESS SWELLING AND DISTORTION because of tapering wall thickness, scientific side-wall angles.

3 TOUGH, DURABLE, close-grained, yet has high machinability.

4 INSPECTED THREE TIMES to assure you of only the finest workmanship and soundness in every detail.

Fast delivery in all sizes and styles. Also available: Ingot Molds, Utility Castings, Goosenecks. For details, write Dept. PM-9.

AMERICAN CAR AND FOUNDRY
DIVISION OF acf INDUSTRIES, INCORPORATED
750 Third Ave., New York 17, N.Y.

Sales Offices: New York • Chicago • St. Louis • Cleveland • Washington, D.C. • Philadelphia • San Francisco • Berwick, Pa. • Huntington, W. Va.
Plants: Berwick, Pa. • St. Louis, Mo. • Huntington, W. Va.

For more information circle No. 2 on the Reader Service Card

USEFUL LITERATURE

continued from page 85

Fastener Specification Sheet: 191
GRIES REPRODUCER CORP.—Specification sheets have been issued on special types of die cast zinc alloy threaded fasteners: low washer base wing nuts, low low wing nuts, and round wing nuts.

Paint Stripping: 192
OAKITE PRODUCTS, INC.—"How to Strip Paint", is a helpful booklet that specifies material and method. It will help simplify your problem of stripping synthetics.

Abrasive Belt Grinder: 193
ENGELBERG, INC.—Literature is available on Model #696, a precision abrasive belt grinder that permits two or more high-speed grinding and finishing operations in the same time as formerly required for a single operation.

Simultaneous Cleaning; Phosphating: 194
TURCO PRODUCTS, INC.—Technical literature describes a new material, Turcoat 4185, for the simultaneous cleaning and light phosphating of zinc in three simple stages.

Fastener Catalog: 195
CARR FASTENER CO., DIV. UNITED-CARR FASTENER CORP. —Data Catalog No. 57 presents the company's specialized fasteners for automobiles, aircraft, and electrical appliances.

Ultrasonic Detergents & Solvents: 196
NARDA ULTRASONICS CORP.—Literature describes a new water-wash detergent and a new degreasing

Do you lack the Right
METAL TREATING PROCESS
to tie in good product design with good Paint Finish?

● Play your cards right—Insure greater paint durability. Treat your metal before painting the safe, proven way—We supply the complete "package" for Cleaning, Rust Removing, Phosphate and Conversion Coatings, along with the technical know-how and experience—Let us make recommendations. Write today.

METALPREP
GALVAPREP
LYFANITE
PHOSTEEM
PREP-N-COTE
N.C.Co.
Metal Conditioning
Rust Removing
Phosphatizing
products for
STEEL, ALUMINUM,
ZINC, CADMIUM, etc.

Use PREP PRODUCTS
Be Safe! Be Sure!

NEILSON CHEMICAL CO.
Southeastern Distributor: P. H. ROSS CO. Charlotte, North Carolina
2330 Gainsboro, Detroit 20 (Feradale), Michigan
Alientown, Penna. Los Angeles, Cal. Windsor, Ontario

For more information circle No. 90 on the Reader Service Card

solvent. The two products are known as "Blast 1", for use as an additive to water baths, and "Blast 2" for use as a degreasing bath.

New Phosphating Material: 197

TURCO PRODUCTS, INC.—Bulletin No. 108-19 describes Turcoat 4333, a new phosphating material that provides a tight bond for paint, other organic finishes and metal drawing.

Buffing & Polishing Machinery: 198

DIVINE BROTHERS CO.—A brochure is available that describes the company's buffing and polishing machinery that is "job-engineered" to specific problems.

Diamond Grinding Wheels: 199

DIACRAFT, INC.—A 28-page catalog announces the company's new metallic and resinoid bonded diamond grinding wheels. The wheels are available in all the customary shapes and sizes for carbide grinding as well as custom-made wheels for special applications.

Rubberized Abrasives: 200

CRATEX MFG. CO.—The new industrial catalog of rubberized abrasives for deburring, smoothing and polishing is now available. Uses of rubberized abrasive wheels, points, blocks, sticks and cones, are explained.

Vacuum Metallizing: 201

BEE CHEMICAL CO., LOGO DIV.—16 page technical report. A description of the vacuum metallizing process with special emphasis on materials for both the undercoat and overcoat. Complete application information and test data are included.

Air Tools: 202

PRATT & WHITNEY CO., INC.—Circular No. 616 describes "Kellerflex" high speed air tools which operate at free speeds of up to 60,000 rpm. Designed for powering steel burs, sanding drums, and polishing accessories, the units operate from a standard air supply.

Carbide-Tipped Saw Blade: 203

RADIAL CUTTER MANUFACTURING CORPORATION—A new circular saw blade was specially-designed for cutting non-ferrous metals, reduces formation of burrs. Complete price, size and specification data is furnished in a catalog sheet.

Fast Ball Mills: 204

STEELE & COWLISHAW LTD.—Greatly accelerated grinding action is claimed for English-built mills that operate on a planetary motion principle. A powerful centrifugal force is set up which holds the grinding media and charge against the wall of each pot. Literature offered by Kady International Corp., U.S. distributor, tells the full story.

Hand Milling Tools: 205

PRECISE PRODUCTS CORP.—27-page catalog and supplemental price sheet give complete data on powerful hand grinder-millers, along with milling machines, lathes and drill presses powered by the units. Models develop up to 1½ HP at 25,000 RPM.

Parts Inspection Equipment: 206

MAGNAFLUX CORPORATION—12-page booklet presents 9 systems of non-destructive testing: systems give visual indication of surface and sub-surface flaws in a variety of materials. One, called "Stresscoat", shows stress concentrations.

PICTURED ABOVE IS OUR MODERN SHOP AND OFFICES

exclusively devoted to engineering and building die casting dies and molds to exacting specifications. This plant was designed with capacities to handle and fabricate anything from a unit die insert to a 15 ton cylinder or grille die with the necessary skills and experience to save you time and money on your next tool.

RICHARD O. SCHULZ CO.

ELMWOOD PARK, ILLINOIS

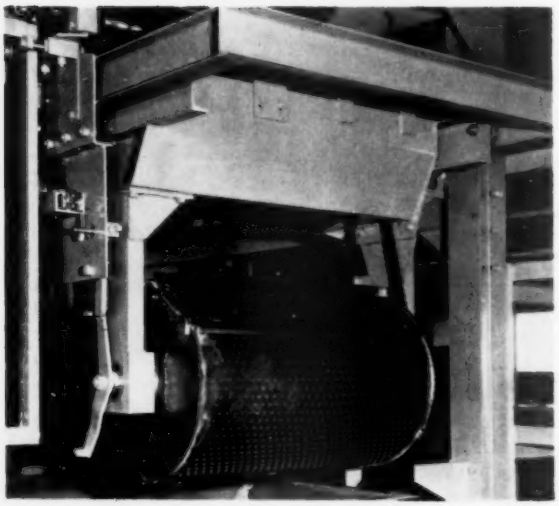
●

DIE CASTING DIES • PLASTIC INJECTION AND COMPRESSION MOLDS

For more information circle No. 74 on the Reader Service Card

NEW PRODUCTS AND DEVELOPMENTS

Want complete details on these announcements? Use the Reader Service Cards. You'll find them facing page 64 of this issue



NEW PROCESSING BARREL
. . . opens, closes automatically

HANSON-VAN WINKLE-MUNNING CO., has introduced a new metal processing barrel with a horizontal barrel door that opens and closes automatically. The barrel is designed for cleaning, phosphating, blackening, Lubrite, Bonderizing, chromate treatments, pickling, and similar processing.

Because of its automatic features, the barrel readily lends itself to integration into automated processes. It is adaptable to automatic hopper feeding and automatic unloading to hoppers or conveyor belts. The company has announced that it will soon introduce a new automatic machine with features that make it especially suitable for conveying the new barrel from tank to tank.

The barrel is capable of handling heavy loads of large or small parts. Its size and configuration can be tailored to individual requirements.

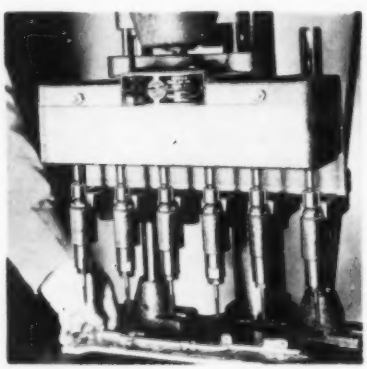
Circle No. 256 on the Reader Service Card

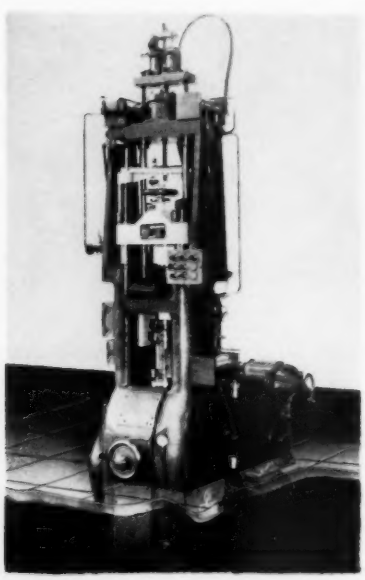
MULTIPLE SPINDLE HEAD FEATURES LUBRICATED BALL JOINTS

The "Knuckle-head 1000", is a new straight-line adjustable spindle multiple drilling and tapping head. Manufactured by ETTCO TOOL & MACHINE CO., the unit features 6 fully adjustable universal ball joint type spindles that are lubricated with one-shot lubrication. The ball joints are covered with neoprene covers to retain the lubricant.

The head is capable of operating in any position on any drill press, drill unit or tapping machine. These model 1000 heads will run at top speed in either direction without vibration regardless of spindle location. Spindles can be located anywhere within a 3" diameter with a 15/16" minimum center distance, even while the unit is running. The heads are available with either adjustable locating arms or aluminum templates.

Circle No. 257 on the Reader Service Card





75-TON COMPACTING PRESS
. . . offers faster, better parts production

A new high in production speed and quality and the elimination of powder loss, are the main features of the new Baldwin Model 75-A compacting press. Introduced by the HAMILTON DIV., BALDWIN-LIMA-HAMILTON CORP., the press was designed for compacting such materials as powdered metals, abrasives, carbides, cermets, ferrites, nuclear and other solid fuels.

The press is a redesign of the previous Model 20-A. Design changes include:

1. New upper housing design.
2. A pair of spring-loaded powder cutoffs on shuttle feeder.
3. Relocated die float upstop.
4. Increased capacity of die float downstop.

The press uses a separate die holder and has a complete new upper housing design so that the feeder is connected directly to the die holder. This setup practically eliminates powder loss. The die float upstop has been removed from the die area and is now placed where it will not become accidentally contaminated with powder.

The shuttle feeder has spring-loaded cutoff rings between shuttle and hopper and between shuttle and die surface to cut powder loss to a minimum.

Tools for the 20-A press are interchangeable with the New 75-A.

Circle No. 207 on the Reader Service Card

Continued on page 96

HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

You get speedier service from the ZINC ZONE

Central location of American Zinc plants assures prompt deliveries of slab zinc to any point in the nation.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc Sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

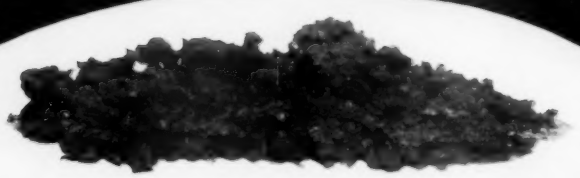
For more information circle No. 7 on the Reader Service Card

At last A ZINC FLUX

which drastically reduces
metal loss and fuming problems

Foseco® Zinc Coveral 85

Skimmings obtained from a zinc alloy melt on which Zinc Coveral 85 was not used. Note high metal content.



Skimmings obtained from a similar melt treated with Zinc Coveral 85. Note powdery dross and absence of metallics.

What Zinc Coveral 85 does for you—

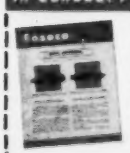
- reduces metal loss
- produces high quality metal, free from oxides and dirt
- reduces loss of production time—small amount of fuming does not affect workers
- won't change composition of the alloy
- eliminates corrosive fumes—castings in shop area won't be corroded
- gives more economical operation—less flux required to do job

. . . and Foseco Zinc Coveral 85 is ideally suited for use in both pot and reverberatory furnace melting

FOUNDRY SERVICES, INC.

2000 BRUCK STREET COLUMBUS 7, OHIO

In Canada: FOUNDRY SERVICES (CANADA) LTD., 201-7 Alice St., Guelph, Ontario



Send this coupon for free leaflets giving all the facts about treating zinc and zinc base alloys.

Name_____

Company_____

Address_____

City_____ State_____

For more information circle No. 40 on the Reader Service Card

NEW PRODUCTS

continued from page 89

RUST-PREVENTIVE OIL
. . . eliminates water spotting

Excellent water-displacing properties of "Froil", produced by OCTAGON PROCESS, INC., lift moisture from the deepest crevices of highly machined and polished metal parts after cleaning. Neutralizing action prevents corrosive attack due to fingerprints and general shop soil and sets up a moisture-proof barrier. Froil-treated metal parts, tested in a humidity box, have withstood 100% humidity at 120° F. for more than two months without rusting.

Circle No. 229 on Reader Service Card

NEW RECTIFIER PERMITS
. . . pre-plating etch

Reverse-current etching *before* plating in high-amperage ratings is the outstanding feature of the new current-reversal rectifier made by the SEL-REX CORPORATION.

Other attractions are: Simplified and less expensive installations, and a 50% cut in initial expenditure.

Circle No. 230 on Reader Service Card

SPLIT DRUM SANDER
. . . cuts abrasive costs

The Cone-Loc drum sander uses ordinary strips of coated abrasive, rather than endless belts, for buffing, polishing or metal removal operations. Abrasive strips can be quickly and easily wrapped around the drum, hooked over pins, and locked down. Manufactured by AMERICAN DIAMOND SAW SALES, the tool is precision machined and balanced to run true at speeds up to 6000 rpm.

Circle No. 231 on Reader Service Card

LOW-COST PRESERVATIVE
. . . is easily removed

Sabrex, a non-oxidizing wax-type liquid which sprays on and sprays off with an inexpensive solvent, has been suggested for use in in-process protection of parts. It protects both ferrous and non-ferrous metals, and has good penetrating ability. Sabrex was developed by NORTH

AMERICAN AVIATION, INC., and has been licensed for sale by NaVan Products, Inc.

Circle No. 232 on Reader Service Card

LEAD POT FURNACES
. . . for heat treating

Type LRP lead pot furnaces from C. I. HAYES CO. are designed for hardening and tempering various steels in a fast heating liquid medium at temperatures from 750° to 1600° F. Sinuous wound 80-20 nickel-chrome ribbon heating elements are designed for easy installation and removal.

Circle No. 233 on Reader Service Card

HAND SCREW DRIVER
. . . delivers preset torque

A new hand screw driver for precision assembly production and maintenance jobs where powered tools cannot be used has a roller drive clutch adjustable from 0 to 25 inch pounds of torque. The clutch rolls into a free position when preset torque is reached, so that further tightening of the screw is impossible. The tool was developed by SCULLY-JONES AND COMPANY.

Circle No. 234 on Reader Service Card

JUMBO TAP EXTENSIONS
. . . offer speedy coupling

New tap extensions from RITMAR CORPORATION tap hard-to-get-at holes with taps larger than ¼ in. with ease and accuracy. A collet grip permits changing dull or broken taps without using tools by loosening or tightening the collet cap with thumb and finger. Two or more extensions can be coupled together to form as long an extension as required for the job.

Circle No. 235 on Reader Service Card

THREAD COMPARATORS
. . . of external and internal type

Visual thread comparators that speed production and final acceptance gaging of threads are being manufactured by the HANSON-WHITNEY CO. The instruments are designed for fast, accurate, and economical visual gaging of all forms and classes of external or internal threads.

Circle No. 236 on Reader Service Card

TEMPERATURE CONTROL
. . . is accurate and inexpensive

The E65N, a sensitive, indicating, remote bulb temperature control, is being offered in basic skeleton form (without enclosure) so that it may be designed into equipment. Built by UNITED ELECTRIC CONTROLS CO., the unit is suited for applications where accuracy and size are important factors, but wide ranges are not needed.

Circle No. 237 on Reader Service Card

HEATING ELEMENT ALLOY
. . . is inexpensive

Alloy 835, a new series of iron-chromium-aluminum alloys, was designed by HOSKINS MFG. CO. for use in moderately high-temperature electrical resistance heating applications. It has improved ductility and low growth characteristics where operating temperatures do not exceed 2250°F.

Circle No 238 on Reader Service Card

continued on page 96

BDC

AN ACCEPTED SYMBOL OF THE BEST IN DIE CASTING SERVICES...

Experience. *Our expert engineers, designers and production men know how to save you money while turning out top quality die castings.*

Modern Facilities. *Modern tool room and die casting equipment are at your service when you buy from Badger.*

Service. *Speed, dependability and cooperation are keynotes in our customer relationships.*

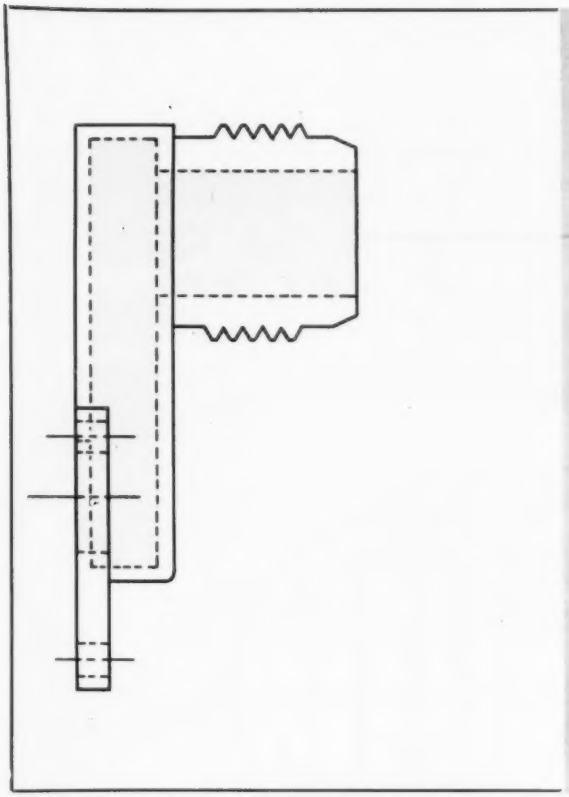
Engineering Help. *The advice and assistance of our engineers can save you time and dollars in designing your castings.*

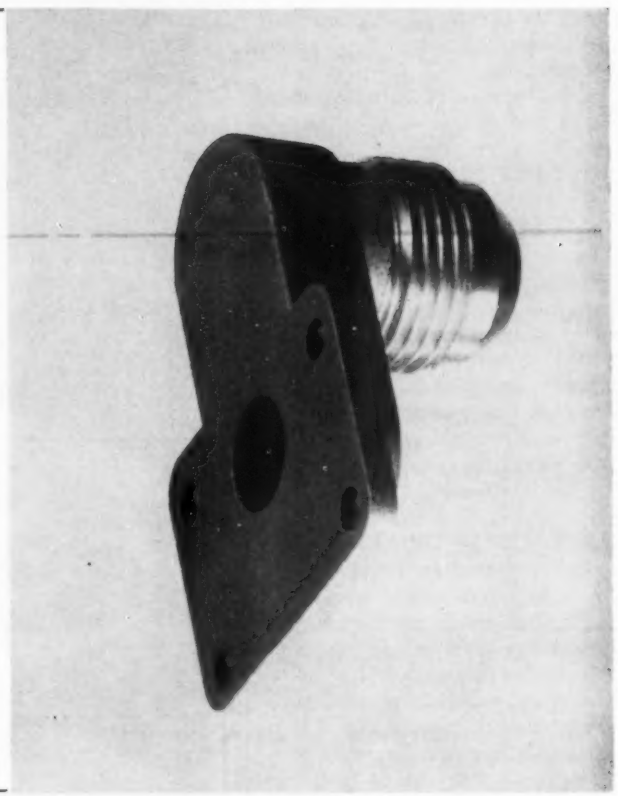
Reasonable Prices. *You'll find Badger die castings fairly priced.*

Badger Die Casting Corporation

201 W. OKLAHOMA AVE., MILWAUKEE 7, WISCONSIN

For more information circle No. 17 on the Reader Service Card





PROBLEM: After they studied the elbow fitting, the engineers said it was impossible to make it economically and meet all the specifications. The part to be used in military and commercial aircraft, had to be designed and made to the exact shape shown. It was necessary that it be light-weight, rigid, and that no latitude in design be allowed. It was to be manufactured as a complete unit to insure rigidity, and to eliminate assembly problems – if any.

SOLUTION: Examination of all possible manufacturing methods for mass production of this elbow fitting led Alar's engineers to make one important discovery: advantages of the investment process.

Investment casting was the only precise manufacturing method which would meet the exacting specifications governing: weight, design, rigidity, and construction-unity cost. The elbow is investment cast in No. 356 aluminum alloy.

INVESTMENT CASTINGS

Now Your Complex Coring

AS far as design specifications are concerned, the part seen here which was once fabricated, was adequate for its purpose.

But when building aircraft, weight is of primary consideration. If you were buying an airplane by the pound, a modern type of military aircraft would cost approximately $500 per pound. Thus if the plane's weight could be cut by one pound, this amount would be saved.

It was on this point that the fabricated parts failed to meet requirements specified.

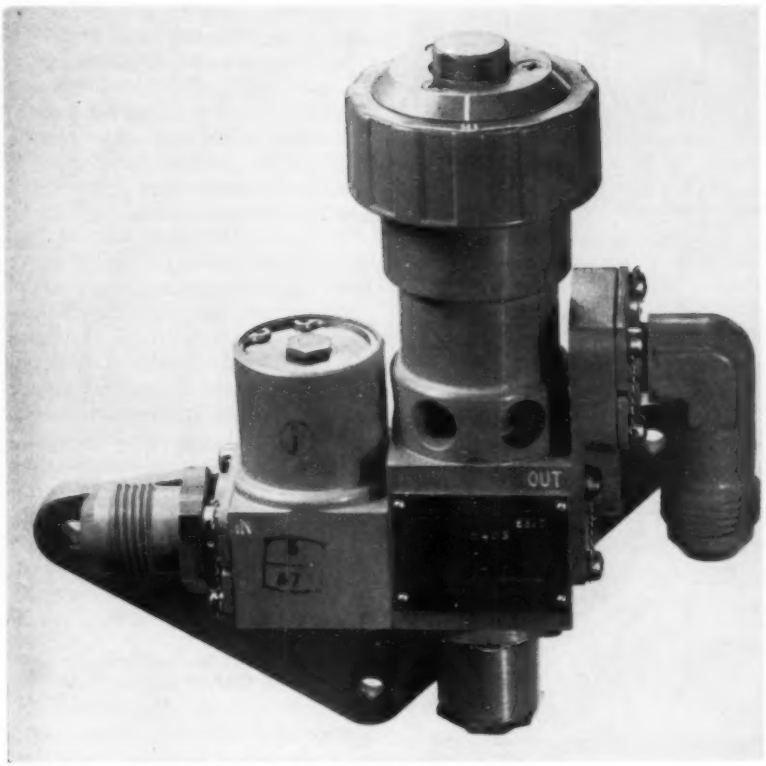
Weight, rigidity, unity of construction, special design, and cost factors gave Alar reason enough to use investment castings in constructing their valve for regulating pressures in anti-G suits.

A re-examination of the fitting showed it could be improved in several ways:

- The weight could be reduced.
- Design improvement was possible.
- Construction methods could be improved.

As a result of the study, and consideration of these possibilities for improvement, it was decided to produce a part that would meet the requirements of both military and civilian commercial aircraft.

Concrete evidence of the soundness of their conclusions is seen in the investment cast part itself. By using the investment process, this aluminum alloy fitting was of superior design.



HOW IT WORKS: The anti-G suit-valve was designed to overcome the effects of acceleration in very high speed aircraft. Alar Products, Inc., of Cleveland, Ohio, manufactures a pressure regulating valve that maintains the proper suit-pressure at varying altitudes. Without the valve to regulate pressure, the increasing "G" forces will incapacitate the pilot.

Valves control air flowing from the bleed-off of a jet-engine compressor – or any other source of compressed air. They automatically provide air at the proper pressure needed to operate the pilot's anti-G suit during periods of positive acceleration. Besides being automatically actuated, the pictured valve can be adjusted to permit the entry of air at both high and low pressures as it is needed.

Problems Can Be Solved

It was possible by this method, to achieve the thin-walled sections of the adapter and the cavities in the outlet fittings. While doing this, the shape originally specified, was retained. The characteristic unity of construction which is easily seen in the newly designed fitting, not only eliminated several unnecessary components, but as an added benefit, provided a dependable rigidity which had been impossible to obtain earlier.

Assembling the investment casting into the device has reduced the weight of the regulator so that it now tips the scales at less than two pounds.

The fittings are manufactured for Alar by the Hitchener Manufacturing Co., Inc. They are investment cast by assembling two precision-made wax patterns to form the complete pattern.

The core is supported by anchoring it through the holes and into the hollow center.

This pattern is melted away before casting, leaving the precision-shaped cavity in the mold.

make it BETTER within your BUDGET

Many cost-saving advantages are often overlooked on straight competitive bidding. Your engineering design, plus expert foundry analysis, can result in quality production castings at lower end-cost.

Monarch's proven techniques and automated production experience help your own engineering staff to improve initial design. Monarch offers to you, years of pioneering experience in

ALUMINUM PERMANENT MOLD
ALUMINUM DIECASTING and
CERTIFIED ZINC DIECASTING

In addition you gain Monarch know-how and unique facilities to produce finished castings that reduce end-cost.

Exclusive Velvaglaze® and Porceglaze finishes are examples of progressive research and customer service. Send your next inquiry to Monarch.

MANUFACTURING ACHIEVEMENTS in MOLTEN ALUMINUM

MONARCH ALUMINUM MFG. COMPANY
9205 Detroit Avenue Cleveland 2, Ohio

Circle No. 62 on the Reader Service Card

For more information circle No. 10 on the Reader Service Card

AUTO-DIESEL now offers COMPLETE DIE CASTING SERVICE

Since 1936 Auto-Diesel has been making Die Casting parts of all kinds. We are now in position to give complete Die Casting service. Can supply replacement parts for all Die Casting machines. We can supply rods and tips, injection cylinders, goosenecks, plungers, unit dieholders, melting pots and nozzles. We are in position to give you good service — at attractive prices. We suggest you send prints for quotation.

You buy AUTO-DIESEL TWO or THREE PIECE PLUNGER SEGMENT RINGS *at* ATTRACTIVE PRICES

Delays cost money in many ways. We can supply QUALITY Auto-Diesel Two or Three Piece Plunger Segment Rings QUICKLY. We specialize in SMALL runs and can sell at ATTRACTIVE prices. Made in sizes from 1½" to 4" by ⅜".

Phone Our Representative Nearest You

Chicago Rep.—Virco Holstrom—Phone GL 4-6505
Detroit Rep.—Clifford-Rockwell Co.—Phone DI 1-8873
Cincinnati Rep.—Tarkington-Van Attan Co.—Phone PL 1-1434

Write for Details

THE AUTO-DIESEL PISTON RING CO.
3135 Superior Avenue • Cleveland 14, Ohio
"RINGS and SHAPES *Since* 1921"

Kaiser Appoints New Metals Distributor

THE GEORGE SALL METALS CO., INC., Philadelphia, Pa. has been appointed ingot distributor for KAISER ALUMINUM & CHEMICAL SALES, INC.

Hevi-Duty Announces Staff Additions

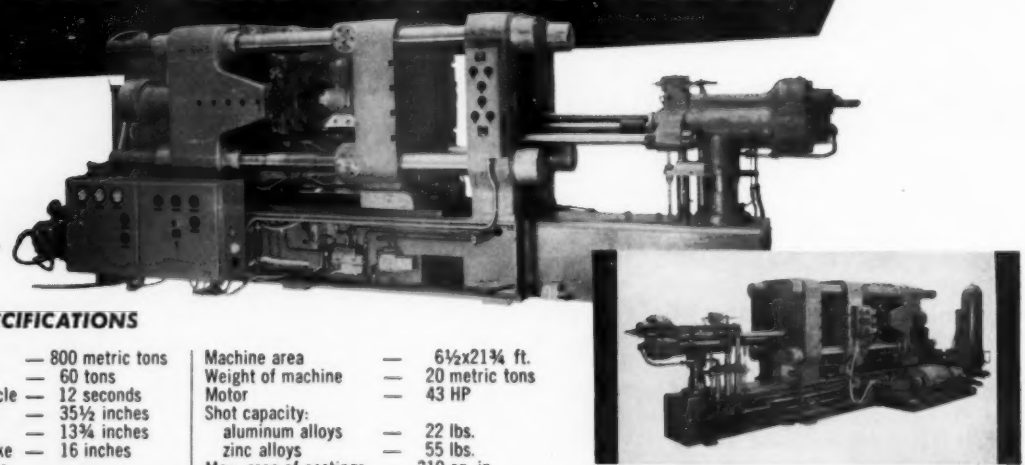
Following the acquisition of the Industrial Furnace Div. of Eclipse Fuel Engineering Co., HEVI-DUTY ELECTRIC CO. announced additions to its staff of: Richard Hayden, formerly head of the Industrial Furnace Div. at Eclipse who will have charge of gas furnace sales; and Norman Acker, formerly superintendent of furnace manufacturing at Eclipse, who will perform liason work between engineering, sales, and production.

William Swanson will be sales and service engineer for automatic heat treating units.

Foote Mineral to market Nickel and Cobalt

Sherritt Gordon Mines, Ltd., has appointed the FOOTE MINERAL CO. as its exclusive sales agent in the United States and Canada for nickel and cobalt metals.

Introducing the new
BUHLER DIE CASTING MACHINE
Type GPF
800 TONS LOCKING FORCE



SPECIFICATIONS

Locking force	— 800 metric tons	Machine area	— 6½x21¾ ft.
Injection force	— 60 tons	Weight of machine	— 20 metric tons
Time per free cycle	— 12 seconds	Motor	— 43 HP
Die height max.	— 35½ inches	Shot capacity:	
Die height min.	— 13¾ inches	aluminum alloys	— 22 lbs.
Die opening stroke	— 16 inches	zinc alloys	— 55 lbs.
Space between tie bars	— 28x30½ h/v in.	Max. area of castings with min. injection pressure	— 310 sq. in. — 5700 lbs./sq. in.
Size of die platens	— 45x47¼ h/v in.		

WRITE FOR COMPLETE INFORMATION

BUHLER BROTHERS, INC. (U.S.A.)
130 COOLIDGE AVENUE, ENGLEWOOD, NEW JERSEY

Engineers for Industry Since 1860

BUHLER BROTHERS (CANADA) **LTD.**
24 KING STREET WEST, TORONTO 1, ONTARIO

For more information circle No. 16 on the Reader Service Card

European Investment Casters Organize

A new trade association for the investment casting industry in Great Britain has been formed. Known as THE BRITISH INVESTMENT CASTERS' TECHNICAL ASSOCIATION, the organization is modeled after the Investment Casting Institute in this country.

At the first meeting, attended by representatives of some twenty-five companies, an executive council was elected and arrangements made to share office space and secretarial services with B.S.C.R.A. At this first meeting 18 founder members were present, of these eight are full members (investment casting foundries) and ten are associate members (supply industries). The association can be reached through Mr. J. Bolton, secretary, at 5, East Bank Road, Sheffield 2, England.

Kenneth C. Brownell Of AS&R Dies

Kenneth Cooke Brownell, chairman of the board of AMERICAN SMELTING & REFINING CO., died August 4, 1958.

Mr. Brownell joined AS&R in 1927 in the ore purchasing and sales departments. He was made vice president in 1936, executive vice president in 1947 and president in 1949. He was elected board chairman and chief executive officer in April, 1957.

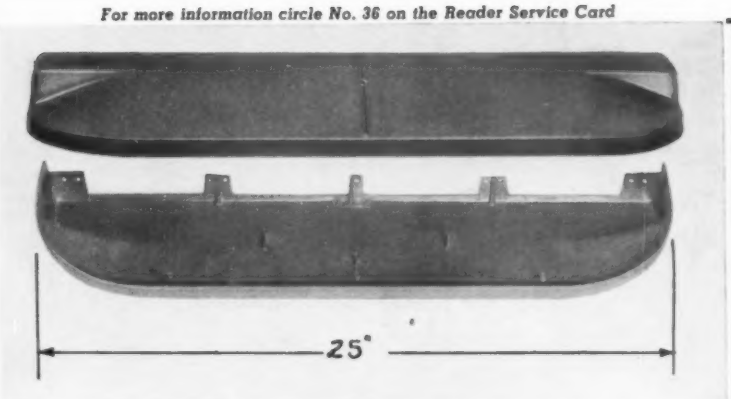
Allied Research to Market Cowles Cleaners

J. A. Cairns, vice president-sales, for ALLIED RESEARCH PRODUCTS, INC., has announced that his company will market the complete line of cleaners for metal finishing manufactured by Cowles Chemical Co. Allied Research will provide sales representation and service on a nation wide level.

Standards Engineers Society Meeting

The seventh annual meeting of the Standards Engineers' Society will be held September 22-24, 1958, at the Benjamin Franklin Hotel, Philadelphia, Pa. Full information and a complete program for the meeting can be secured from Fred F. Van Atta, 1916 Race St., Philadelphia, Pa.

For more information circle No. 36 on the Reader Service Card



WHY ALUMINUM DIE CASTINGS

Todays juke box designers are taking advantage of light weight, low cost die castings to specify functional exterior trim parts. A variety of finishes that can be done to the die casting gives versatility.

Federal
DIE CASTING COMPANY
2220 NO. ELSTON AVE. CHICAGO 14, ILL.
Phone AR-6-4805

Richards
DOUBLE-IMPRESSION
MASTER-MOLD

MASTER-MOLD WORKS FOR YOU to bring overhead and operating costs down to a realistic level. **MASTER-MOLD** can save you up to 70% because this new technique eliminates expensive die sets and other costly equipment — slashes set-up time, labor costs . . . **handles two jobs at once.**

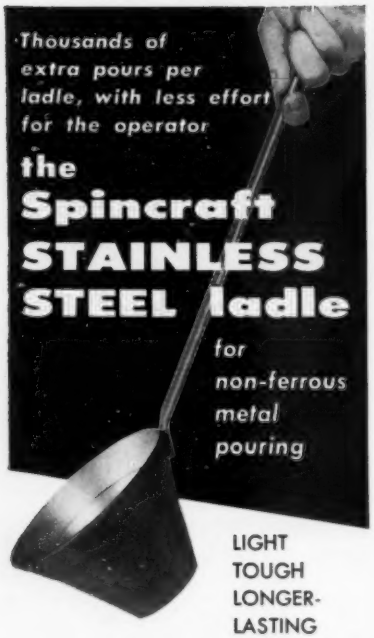
Short runs can be handled profitably! Short runs, long runs can be combined, run together — doubling your machine capacity!

Now you can add to your customers the many small manufacturers and experimental workers who cannot bear the cost of conventional die-casting methods.

. . . write for complete information, or order direct.

RICHARDS TOOL AND MOLD CO.
2215 LATHROP AVENUE • RACINE, WISCONSIN

For more information circle No. 70 on the Reader Service Card


Thousands of extra pours per ladle, with less effort for the operator
the Spincraft STAINLESS STEEL ladle
for non-ferrous metal pouring

LIGHT
TOUGH
LONGER-
LASTING

If you pour non-ferrous alloys, Spincraft ladles will save you replacement costs and make the job much easier. Designed to reduce operator fatigue by their lightness, balance, and non-spill shape, they resist burning-through as only stainless steel with its high critical melting point can do. Spincraft ladles come in 23 sizes, from ¼ lb. to 30 lb. molten metal capacity.

- 75% lighter than cast iron ladles
- Amazingly long life
- Shot-blasted for coating adhesion
- Deep conical form makes pouring easier, minimizes spillage
- Can be used for zinc and other metals without coating
- "Whack proof" handle arc-welded to reinforced cup edge
- Built to last longer, work lighter. Let your operator use one, then try to take it away from him!

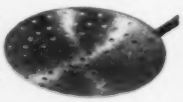
Complete handle on ¼ lb. through 9 lb. size; 10 through 30 lb. size has handle bracket stub to which proper length handle can be attached.

Also...Spincraft STAINLESS STEEL Skimmer

A skimmer that really skims! Shallow radius skims surface impurities instead of ladling as deeper-cupped skimmers do. Correct size holes prevent clogging. Short handle stubs fit common pipe and permit attachment of length and type handle you want.

IN FOUR DIAMETERS: 6 inch, 8 inch, 10 inch, 12 inch.

Spincraft ladles and skimmers are also available in low-cost mild steel.



Spincraft
SPINCRAFT WILL DO IT
INCORPORATED

Write for complete data and prices today.

SPINCRAFT, INC.
4138 West State St., Milwaukee, Wis.
Send us complete information on:

Stainless Steel	Mild Steel
☐ Ladles	☐ Ladles
☐ Skimmers	☐ Skimmers

Company .....
Address .....
City ..... State .....
Name .....

Circle No. 76 on the Reader Service Card

NEW PRODUCTS

continued from page 94

NEUTRALIZER COMPOUND

. . . has anti-rust properties

A new neutralizer compound has been developed by ROTO-FINISH CO., that eliminates rusting and tarnishing of iron and steel parts after surface finishing. The compound is a dry, non-abrasive blend of alkaline materials. Its specific anti-rust properties neutralize the effects of acid compounds used on metal surfaces during barrel finishing for removal of heat-treat scale.

Completely soluble, the compound leaves no insoluble residue on the part surfaces or slots.

Circle No. 208 on the Reader Service Card

MACHINABLE CARBIDE ARBORS

. . . for coil spring winding

Ferro-Tic, a new machinable cemented carbide, for spring coiling arbors, has been announced by SINTERCAST CORP. In preliminary tests, the new arbors showed a threefold increase in average spring production over previously used tungsten carbide. Readily machined in the annealed state, required fabrication is completed prior to oil-quench hardening. Once hardened the Ferro-Tic arbor tip is extremely resistant to the severe abrasive action inherent in the coiling operation.

Circle No. 209 on the Reader Service Card

ROTARY TABLE

. . . offers greater accuracy

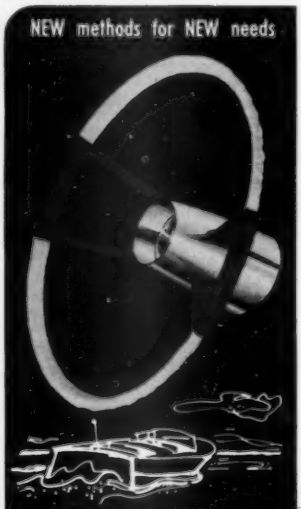
Greater accuracy in performing a variety of operations, such as cutting segments of circles and circular slots, milling clutch teeth, cutting irregular contours, etc., is the main feature of the Troyke Rotary Table line. Features include larger diameter, easy-to-read dials; one-piece worm shafts; enclosed base; precision ground turn-tables accurately graduated in one degree increments; and easy to follow index plates. Total guaranteed accuracy, of the table manufactured by TROYKE MFG. CO., in sixty seconds or less. The tables are available in six diameters, ranging from 9" to 25", and eight models.

Circle No. 210 on the Reader Service Card

NEW RECORDING HYGROGRAPHS

. . . are inexpensive

A new line of low-priced recording Hygrographs, Thermographs



CAST - O - MATIC
Zinc and Aluminum Die Castings

NEW Name • Facilities
Automated equipment
Concept of production to lower cost and improve product
Opportunities for buyers for QUALITY and SERVICE

DESIGN • ENGINEERING • PRODUCTION
planned, supervised and accomplished by a practiced work force of competent specialists whose long experience guarantees superior craftsmanship.

Providing:

- Complete design engineering service
- Die Casting dies and secondary tooling
- Finished castings (buffing, plating, painting)
- Intricate assembly service

CAST-O-MATIC
CORPORATION
Box 1172, Syracuse 1, N. Y. — Tel. HE 7-8441

Member: American Die Casting Institute

Sales and Service Representation in all areas
Detroit — UNiversity 4-2030 \ Philadelphia — RIttenhouse 6-6784

For more information circle No. 27 on the Reader Service Card

and Hygrothermographs have been introduced by SERDEX, INC. Designed for plant use, these recorders are guaranteed for one year.

The Hygrograph is guaranteed accurate within ± 5% over a 15% to 95% relative humidity range and a + 32° F. to + 130° F. temperature range. The Thermograph is accurate within ± 2% over a range of 0° F. to 100° F.

Circle No. 212 on Reader Service Card

4" DIFFUSION PUMP
. . . claims new high speed

The EP4W 4" fractionating oil Diffusion Pump is claimed to have the highest pumping speed, lowest backstreaming and highest forepressure of any competitive 4" pump. Pumping speed of the water-cooled, three-stage pump is 420L/sec. at $5x10^{-5}$ mm Hg, and backstreaming is 0.04 cc/hr. at 25°C. The extra high limiting forepressure tolerance, 525 microns at $5x10^{-5}$ mm Hg, provides excellent booster action qualities. The unit is now available from the VEECO VACUUM CORP.

Circle No. 211 on the Reader Service Card

NEW HIGH-VACUUM
. . . bellows sealed valves

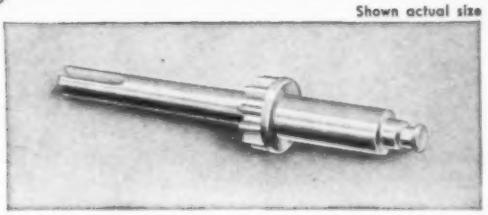
VEECO VACUUM CORP., has expanded its line of bellows sealed valves for high vacuum service with the introduction of a 3" model. The R-300-S has exceptionally high conductance as the result of an unusually large stroke, short flow path through the valve, and an unobstructed, full-size port. The valve is designed for solder connection and may be installed in any position.

Circle No. 226 on the Reader Service Card

continued on page 98

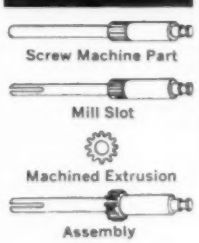
here's PROOF of how the GRC method cuts the cost of small parts...

Shown actual size



Take, for example, this part which previously had been produced 3 different ways . . .

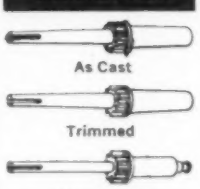
METHOD A — ASSEMBLY OF 2 SCREW MACHINE PARTS



4 Production Steps

+ 3 inspections

METHOD B — CONVENTIONAL DIE CAST AND MACHINED PART



3 Production Steps

+ 2 inspections

the GRC method — AUTOMATICALLY DIE CAST

1 Production Step

only one inspection

Now take a look at these comparative figures . . .

	Purchased Material	Cost/M	Scrap Generation	Cost in lots of 100 M	500 M
Method A	Brass	$30	30%	$70/M	$69/M
Method B	Zinc Alloy	$3.82	5%	$30/M	$28/M
GRC Method	Zinc Alloy	$3.64	None	$15/M	$11.50/M

Check the chart: you'll see clear proof of how GRC's DIE CASTING METHOD offers substantial savings on your small parts. The Gries Method delivers parts of high uniformity, with close tolerances . . . ready for use. Assembly and most other secondary operations are eliminated.

Write, wire, phone NOW for GRC's bulletin "Small Die Castings Exclusively"; send prints for quotation.

MAXIMUM SIZE: 1¾" long, ½ oz.
NO MINIMUM

GRC® GRIES

GRIES REPRODUCER CORP.

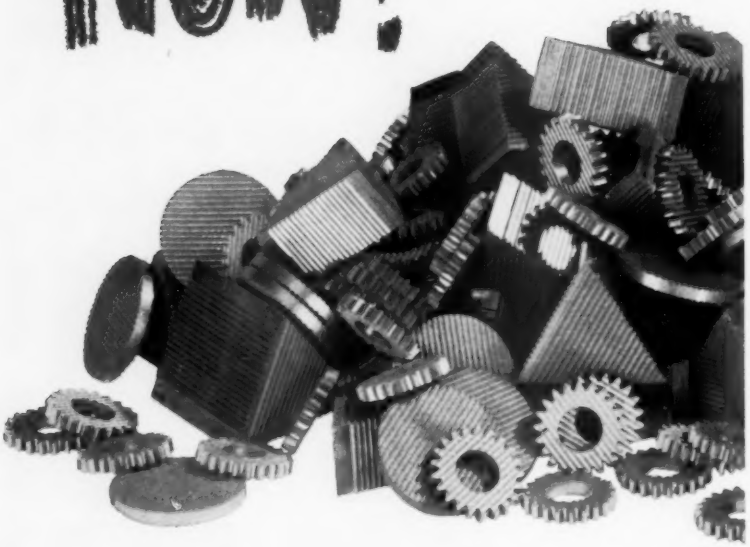
World's Foremost Producer of Small Die Castings

157 Beechwood Ave., New Rochelle, N. Y., NEw Rochelle 3-8600

For more information circle No. 42 on the Reader Service Card

Now!

SINTABUR*
SINTABRITE
SINTAHONE
SINTACUT
SINTACOTE



Scientifically-designed sintered-metal
TUMBLING SHAPES

(*TM. Reg. U.S. Pat. Off. & Pat. Pend.)

Here is an entirely new type of tumbling media with unique advantages for deburring, grinding, burnishing, and dry lubricant coating. These new media are produced by an exclusive Dixon Sintaloy process which permits low-cost, mass production of shapes with characteristics scientifically controlled for barrel finishing requirements.

Exceptionally long life — plus added savings in shorter work cycles, reduced labor and prolonged life with repeated re-use.

Non-clogging — non-powdering — precise shape, uniformity and great durability minimize clogging, jamming, charging or discoloring work.

Greater efficiency — more uniform results — the ideal media for the job means faster more efficient cutting, more uniform finished parts.

Simpler standardized operation — no compensating for wear during runs — speeds, simplifies and saves labor and assures higher work quality.

Write or wire direct to factory for full data.

DIXON SINTALOY INC.

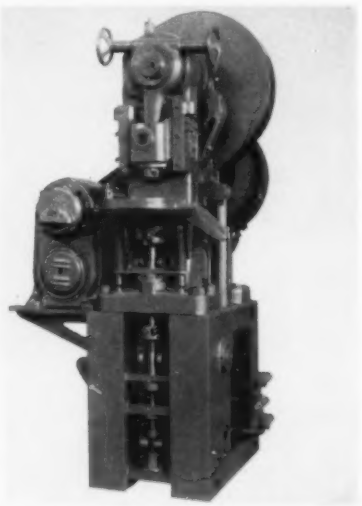
a subsidiary of The Joseph Dixon Crucible Company
536 Hope Street, Stamford, Connecticut

For more information circle No. 31 on the Reader Service Card

NEW PRODUCTS

continued from page 97

3 NEW POWDER METAL PRESSES
. . . have secondary lower motion



F. J. STOKES CORP., has developed three new single-station powder metal compacting presses in the low- and medium-pressure range which incorporate a secondary lower motion. This secondary lower motion is normally operated by compressed air, and works through a crank-and-lever mechanism. It can be utilized for a variety of purposes: to actuate a second lower punch, a moveable core-rod, a stationary core-rod, a stripping core-rod, or an ejection core-rod. This makes possible the production of parts with two different compressing levels.

Circle No. 215 on the Reader Service Card

STEEL CONVEYOR
. . . has "flat-top" design

A Flat-Top hinged steel belt conveyor, for flush-with-floor and conventional above-floor mounting, has been announced by MAY-FRAN ENGINEERING, INC. The belt features precision-formed links, that overlap and interlock to provide a smooth surface. The belt operates in a single pre-determined direction. Used in ordinary floor-mounted conveyors, the Flat-Top steel conveyor allows the side deflection of parts with irregular surfaces, sharp edges and corner flanges without jamming or damage to the parts or belt.

Circle No. 218 on the Reader Service Card

NEW TESTING SYSTEM

. . . combination crack detector & sorting instrument

MAGNAFLUX CORP. has announced a new eddy current testing system that locates and determines the relative seriousness of defects in all conductive materials. It also sorts mixed lots of ferrous and nonferrous metals for differences in hardiness, alloy, and heat treat condition. It will measure the thickness of certain conductive and non-conductive coatings on conductive bases.

The ED-500 consists of an indicating unit, inspection probe, and power line cord.

Circle No. 213 on the Reader Service Card

HYDRAULIC CHECKING CYLINDER

. . . is self contained

The Model HB-125 Hypneumat Hydra-Brake is a self-contained, pull type, hydraulic checking cylinder. The unit, manufactured by HYPNEUMAT, INC., has stroke lengths 3½" to 12", with a checking load of 1200 lbs. The unit provides an external hydraulic feed rate to various type tools or cylinders.

In use, the Hydra-Brake is mounted adjacent to or in line with the tool or cylinder to be hydraulically controlled. A cam, attached to the tool or cylinder, provides the pull force necessary for operation of the unit.

Circle No. 214 on the Reader Service Card

SOLENOID VALVE

. . . now commercially available

The Type SV solenoid valve, specifically designed for high vacuum service, is now commercially available. Manufactured by VEECO VACUUM CORP., the valve features freedom from leakage and high flow conductance. The enclosure of the moving member within the valve body eliminates stem leakage. The unit features a straight-through design, very short flow path, and completely unimpeded ports, resulting in high conductance. The valve is designed for automatically operated vacuum systems.

Circle No. 219 on the Reader Service Card

ULTRASONIC PROCESSING TANK

. . . has 5 gallon capacity

A new ultrasonic processing tank, with a capacity of 5 gallons, has been introduced by THE GENERAL ULTRASONICS CO. The unit has a stainless steel treatment chamber, 14" long x 9" wide x 10" deep and is heliarc welded to aircraft specifications. Power is furnished by the GU-420 generator.

Circle No. 216 on the Reader Service Card

continued on next page

Hall

QUALITY ALUMINUM ALLOYS FOR DIE CASTING, PERM. MOLD, AND SAND

Hall

PRODUCERS OF CHLORINATED INGOT, BILLET, DEOXIDIZERS AND FLUXES

Hall

THE MARK OF QUALITY

Hall ALUMINUM COMPANY

P. O. BOX 223 - 17th & STATE STREET
CHICAGO HEIGHTS, ILLINOIS
Phone SKYLINE 5-0304

For more information circle No. 48 on the Reader Service Card

SELECT CENTURY FOR SPECIAL SHORT RUN DIE CASTINGS

DIE CENTURY CASTING CO.

MODERN EQUIPMENT TO MEET YOUR DIE CASTING NEEDS

SHORT RUNS

Small quantities made economically in both Zinc and Aluminum Alloys

UNIT DIES

For both Zinc and Aluminum Castings at a much lower die cost than conventional dies.

Unit Dies cover a wide range of casting sizes to fit your needs.

Consult Us on Your Requirements

CENTURY DIE CASTING CO.
2629 W. FLETCHER ST., CHICAGO 18, ILL.
TELEPHONE: IRving 8-2629

For more information circle No. 26 on the Reader Service Card

NEW PRODUCTS

continued from page 99

NUCLEAR ENERGY

. . . measures furnace levels

Indicon I-100 is an electronic device which uses nuclear energy to "peer" through the hot walls of foundry furnaces to keep a constant automatic check on the material level inside. The device, developed by NUCLEAR CORP. OF AMERICA, projects gamma rays through the furnace to two Geiger counters, one mounted at the maximum fill level and the other at the minimum level. All components are outside the furnace. Its signal can be used to actuate automatic furnace controls, or it can register on control boards. The unit involves no moving parts, and is unaffected by heat, vibration, impact or continuous use. The standard unit is sensitive to within ±1/100th of the diameter.

Circle No. 223 on the Reader Service Card

PREAMPLIFIER

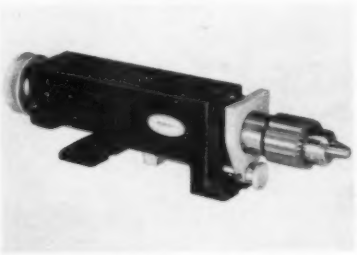
. . . covers from 6-70 MC

Preamplifier PA-620 developed by ARENBERG ULTRASONIC LAB., INC., is a general purpose device. First, it makes available at the ultrasonic transducer output a tuning coil which will resonate at all frequencies from 6-70 MC with the fixed capacity of the crystals which may reach 100 micromicrofarads in ultrasonic work. Second it narrows the pass band and has an improved signal to noise ratio. Other features include a light weight pickup head, and a means to vary the band width.

Circle No. 220 on the Reader Service Card

NEW DRILL HEAD

. . . has low price tag



A new low cost Drill Head, slightly larger than a carton of cigarettes, has been announced by THE BELLOWS CO. Model 22A will drill, tap, ream, spot face, countersink and counterbore. Feed and retract strokes are powered by a built-in air cylinder with a maximum 2" stroke. Drilling capacity is from a No. 80 drill to a 3/16" diameter drill in mild steel.

Circle No. 217 on the Reader Service Card

THREADED INSERT

. . . is self aligning

A new series of self-aligning internally threaded inserts, designed to compensate for misalignment of bolt holes in mating parts, has been added to the Keensert Line by NEWTON INSERT CO. These one-piece units may be screwed by hand into tapped holes prepared

...Rejects knocking your profits for a loop ?

The alloys you're using may be at fault—

- **Do they actually meet specifications?**
- **Do your casters have to "make allowances"?**
- **Is the Inspection Department working "overtime"?**

Then it's time to be sure!

For good casting results your alloys must fulfill a considerable number of specific requirements. For instance, good fluidity to reproduce fine detail, fill out thin sections; stable properties to yield good surface texture, provide adequate mechanical strength; **plus** all the particular qualities to meet **your** casting needs.

See how HB&S start-to-finish quality controls save you time and money . . . help to eliminate rejects . . . guarantee your alloys always 100% "on spec."

Write TODAY for Henning's ALL-NEW "Reference Book and Guide on Zamak (Zinc Base) Die Casting Alloys". It gives valuable production and design data for die casters and engineers . . . and it's yours for the asking.

YOUR CASTINGS CAN BE NO BETTER THAN THE ALLOYS YOU USE.

HENNING BROS. & SMITH, INC.

91-117 Scott Ave., at Randolph St., Brooklyn, N. Y.

SMELTERS AND REFINERS OF ALUMINUM, BRONZE, BRASS, ZINC, LEAD

Dependable service since 1922

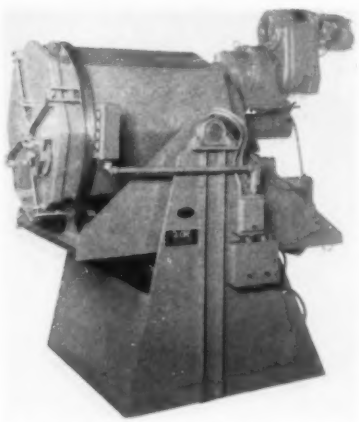
For more information circle No. 43 on the Reader Service Card

with standard drills and taps.

Positive mechanical resistance to rotation is provided by Keensert Kees, which are tightly fastened in the inserts.

Circle No. 224 on the Reader Service Card

BARREL FINISHING MACHINE
. . . has horizontal power tilt



Model 30-34 HPT is a heavy duty finishing machine for grinding and burnishing parts. The machine features a thorough rinsing of parts after grinding and before burnishing. Manufactured by the GLOBE DIV., CASALBI CO., the barrel has a total load of 1500 to 2000 lbs. and can be operated dry or wet. Parts are loaded while the barrel is tilted 40 degrees above horizontal.

Circle No. 225 on the Reader Service Card

MERCURY DIFFUSION PUMP
. . . has high limiting forepressure

An all metal 2-inch Mercury Diffusion Pump, with a higher limiting forepressure than many larger mercury pumps, has been introduced by CONSOLIDATED ELECTRODYNAMICS CORP. The MHG-40 is a water cooled, 3-stage pump. It can maintain a speed plateau of at least 40 liters of air/sec in the 3×10^{-4} to 2×10^{-2} mm Hg pressure range with a peak of 52 liters/sec occurring at 10 microns. An ultimate pressure of 1×10^{-8} may be attained with a cold trap at –63° C.

Circle No. 221 on the Reader Service Card

NEW, HIGH TEMP ALLOY
. . . announced

René 41, is a new nickel base, high temperature, titanium-alumimum hardened alloy. Although it was designed for use in severely stressed jet engine components, its high temperature strength and the fact that it is one of the strongest materials that can be formed and welded, make it well suited for turbine castings. The alloy, developed by the GENERAL ELECTRIC CO., is usable in the 1800 degree F. range. Strength tests show that the .2% offset yield strength at 1200 F. is 125,000 psi. The 100-hour stress rupture strength at 1600 F. is is 25,000 psi.

Circle No. 222 on the Reader Service Card

POWER FILING MACHINE
. . . for filing, trimming, deburring

The Rindis Power Filing Machine is especially designed for filing, trimming and deburring a variety of small components such as moldings, castings, die castings, metal patterns, etc. The unit manufactured by NEWAGE INDUSTRIES, INC., is said to remove material 4 to 6 times faster than by hand filing without the use of abrasives or lubricants. It is designed for all types of work which should not be done on a tool grinding machine. Discs and rings, with various teeth arrangements can be used at different speeds for an extremely wide variety of finishes.

Circle No. 227 on the Reader Service Card

PRICE ASSISTANT SALES MGR.

The appointment of Jack M. Price to the post of Assistant Sales Manager in the Metalworking Chemicals Division is announced by AMCHEM PRODUCTS, INC. of Ambler, Pennsylvania. He will assist central sales operations.

3 NEW PRESSES by JOHNSON ideally suited for DIE CAST TRIMMING

- ☆ Extra Wide Beds
- ☆ Extra Deep Throats
- ☆ Extra Large Ram Faces
- ☆ Extra Shut Heights
- ☆ Extra Large Openings Through Backs
- ☆ Pin Clutch or Air Clutch
- ☆ Flywheel or Back Geared

FOR DETAILED SPECIFICATIONS PHONE, WIRE OR WRITE FOR BULLETIN 1958

Presses of unmatched versatility for draw, punch, trim, cut and assembly operations. 23 Models — 16 to 150 ton cap. OBI Presses. Also Double Crank Gap and Straight Side Presses up to 250 ton cap. Horn Press — 60 Ton

Johnson MACHINE and PRESS CORP.
620 WEST INDIANA AVENUE • ELKHART, INDIANA

For more information circle No. 53 on the Reader Service Card

Zinc And Lead Industries Choose Research Director

In a move to increase the usefulness of both lead and zinc, a joint program of research and development has been initiated. Sponsors of the program are the zinc and lead producers from all over the free world. The work will be directed by Dr. Schrade F. Radtke.

Upon accepting the appointment as research director, Dr. Radtke said: "No more than a casual glance at the consumption statistics for lead and zinc in the United States and in the world is needed to confirm the great usefulness of these two basic materials. . . . The lead and zinc industries must keep pace with the rapid development of new patterns of industrial and consumer needs and usage. This feeling is world-wide. There is much room for optimism that research, over and beyond that now being conducted, will develop new applications.

"The program in research now being undertaken is an important step. It will serve to adapt the unique and useful properties of these two metals to the latest technical advances. Lead and zinc will participate in the rapid development of new ideas, industries, and services to the consumer."

In commenting on the appointment of Dr. Radtke and the expanded research and development program, Simon D. Strauss, vice president, American Smelting and Refining Co., and chairman of the joint program's executive committee said: "The new joint research program has the support of lead and zinc producers in Australia, Canada, Great Britain, Mexico, South America, and the United States. These producers have joined hands to develop necessary knowledge, new products and specific applications aimed at increasing the world-wide consumption of lead and zinc. Although specific new projects have not yet been assigned under the program, this action reflects an increasingly aggressive attitude on the part of both the lead and zinc industries in their search for broader markets."

DR. S. F. RADTKE

The producing companies who are concerned in this joint project are:

American Metal Climax, Inc.; American Smelting and Refining Co.; American Zinc, Lead and Smelting Co.; The Anaconda Co.; Athletic Mining & Smelting Co.; The Broken Hill Associated Smelters Proprietary Ltd. (Australia); The Bunker Hill Co.; Cerro de Pasco Corp.; Combined Metals Reduction Co.; The Consolidated Mining and Smelting Co. of Canada Ltd.; The Consolidated Zinc Corp. (England); The Eagle-Picher Co.; The Electrolytic Zinc Co. of Australia; Hudson Bay Mining and Smelting Co., Ltd.; Mattiessen &

ZANE NEWLY NAMED MARKET ENGINEER

JAMES E. ZANE

James E. Zane is newly appointed Market Development Engineer, representing the American Zinc Institute with a base in Detroit, according to John L. Kimberly, executive vice president of AZI.

Zane's functions include technical and educational activities related to the increased use of zinc die castings. His appointment reflects the zinc industry's desire to supply management, production people, specification writers, designers, and stylists with the latest accurate production and design information on uses of zinc and zinc-base products.

Much of his work will be devoted to the automotive industry, Kimberly pointed out.

Until recently, Zane served as Sales Training Co-ordinator with the Edsel Division of the Ford Motor Co., where he headed training programs for several years.

Zane also served as special representative The Studebaker Corp., in New York City, Chicago, Cleveland, and Pittsburgh.

Zane attended General Motors Institute, later took administrative courses at Purdue University.

His headquarters are at 54 Easton Ave., in Detroit.

Hegeler Zinc Co.; National Zinc Co.; The New Jersey Zinc Co.; St. Joseph Lead Co.; and United States Smelting Refining and Mining Co.

Financial support for research projects will come from assessments on the total lead-zinc metal production of the 19 supporting producers. Companies, research agencies and universities will be engaged in the effort. No limit has been set by the sponsors on expenditure for research. Funds will be provided for any project receiving approval of the Industry Development Committees.

Born in Minneapolis, Dr. Radtke received his doctorate in chemistry from Massachusetts Institute of Technology in 1949. He has been research supervisor for du Pont and in 1953 joined Reynolds Metals Co., where until accepting this appointment he was director of the metallurgical research laboratories. Dr. Radtke is a member of a number of professional societies and honorary fraternities.

New Beryllium Plant Opened

The first privately owned beryllium fabricating plant has just been put into operation by THE BERYLLIUM CORP.

Prior to opening this plant, the only complete beryllium fabricating plant in the country was owned by the Atomic Energy Commission. While most of the output of the new plant will be for nuclear purposes, some experimental shapes for aircraft will be fabricated.

Penn State's Second Foundry Conference Set

The second foundry conference sponsored by Penn State University will be held June 25 to 27, 1959 at University Park, Pa.

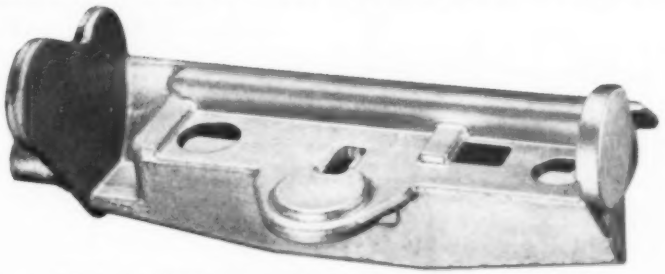
The New Jersey Zinc Company Promotes Four in Traffic Dept.

Kenneth C. Lippman is new Manager of Transportation of the New Jersey Zinc Co., replacing K. L. Baird, General Traffic Manager who retired August 1.

Alfred Blomquist and Daniel H. Vogel are assistant managers of transportation. William Hutchings is the firm's assistant purchasing manager.

For more information circle No. 34 on the Reader Service Card

MEETS 100% X-RAY INSPECTION



THIS ALUMINUM PERMANENT MOLD CASTING,

an aerial sextant trunnion, is made to government specifications and must pass 100% X-RAY inspection. This most exacting inspection, by Eastern, insures high quality castings — immediate user acceptance. Features of this casting include intricate details in its design and the holding of extremely close tolerances.

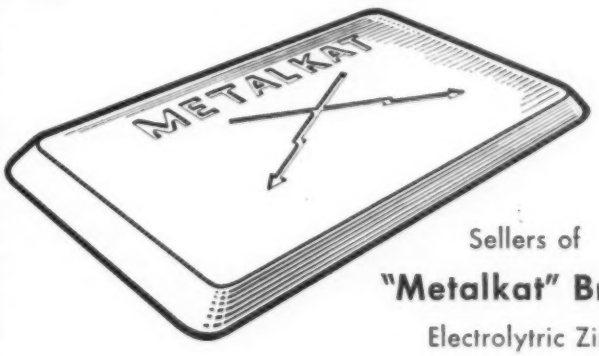
Combined quality and economy in a casting results from a unique combination of assets. At Eastern Casting Corp., years of diversified foundry experience are coupled with the most modern facilities obtainable . . . the results are metallurgically sound castings which meet a wide range of requirements.

We Welcome Your Inquiries

EASTERN CASTING CORP. DIVISION

THE EASTERN MALLEABLE IRON CO.

64 SOUTH WILLIAM STREET, NEWBURGH, NEW YORK



Sellers of

"Metalkat" Brand

Electrolytic Zinc

SPECIAL HIGH GRADE 99.995%

INDUSSA CORPORATION

ZINC
ANTIMONY
LEAD • CADMIUM
NON-FERROUS METALS

ORES
RESIDUES

511 FIFTH AVENUE • NEW YORK 17, N.Y.

Telephone: MUrray Hill 2-4680 • *Cable Address:* INDUSSA • NEW YORK • *Telex:* N.Y. 455

For more information circle No. 51 on the Reader Service Card

PLAST-IRON POWDERS

NEW

Grade A-213

Electrolytic 100 Mesh

Non-Laminating Electrolytic Iron Powder

•

Presses to Ultra-High Densities in One Operation

PM 74

Send for Technical Data and Working Sample

PM PLASTIC METALS

PLASTIC METALS

Division

National-U.S. Radiator Corporation

3458 BRIDGE STREET

JOHNSTOWN, PA.

Circle No. 64 on the Reader Service Card

Hyprez Div. of Engis Announces New Management

Appointments to two management positions have been announced by ENGIS EQUIPMENT CO., HYPREX DIV. Robert E. Reid has

REID

PANKO

been moved from assistant manager to manager of the division and Walter B. Panko has been made national sales manager. The Hyprex Div. markets diamond compounds, oscillating tool finishing machines, and the DiProfiler hand finishing machine.

Personnel Advances At Monarch Aluminum

Two major staff appointments have been made by MONARCH ALUMINUM MFG. CO. Russell A. Lawson, formerly vice president in charge of sales is the new vice president-marketing. Walter V. Tracy, is now general sales manager, commercial div.; he was sales manager, commercial castings division.

First Wheelabrator Fellowships Awarded

As a part of its 50th anniversary, the WHEELABRATOR CORP. set up the Wheelabrator Foundry Educational Program earlier this year. The program is in cooperation with the Foundry Educational Foundation. Over the next ten years, 50 scholarships of $1500 each will be awarded. The first eight recipients have been selected by the committee composed of F. X. Bujold, F. G. Steinbach, W. B. Bishop, W. C. Massari, and C. F. Walton.

The men selected are: Nicholas Baloff, Univ. of California; Richard V. Barone, Mass. Inst. of Technology; Harry D. Bradshaw, Univ. of Alabama; Charles F. Knight, Cornell University; Paul J. Lady, Harvard Business School; William F. Shaw, and James R. Widmoyer, Univ. of Wisconsin; Robert J. Warrick, Michigan State University.

Circle No. 69 on the Reader Service Card

FOR DIE-CASTERS

• LUBRICATES
• CLEANS

BUILT TO LAST

P-W AIR-LUBE SYSTEM

Patent Applied For

• VAPOR IS ADJUSTABLE
• INCOMING AIR IN TANK AGITATES LUBRICANT

Speeds production and eliminates many causes of down-time through effective cleaning and *adjustable* thin-film lubrication of all mold-cavity surfaces.

PROVED IN USE BY PROMINENT DIE-CASTERS

S-W-I-S-H! One pressure whisks mold clean with powerful air jet. S-W-I-S-H! Further pressure on same lever shuts off air and lubricates.

PIERCE-WALLER CO.

KETTERING P.O. BOX 2121A, DAYTON 9, OHIO

STROH

DIE CASTINGS for 55 YEARS

have combined the experience of the *past* with the vision of the *future*. We are one of the oldest die casting companies in the Mid-West.

ZINC or ALUMINUM

We can give you precisely *what* you want *when* you want it.

INQUIRIES INVITED!

STROH DIE CASTING CO. INC.
11123 W. Burleigh St., Milwaukee 10, Wisconsin

Circle No. 78 on the Reader Service Card

Bunting Brass & Bronze Appointments

Two new executive staff members have been appointed by THE

SATTLER

SEARLES

BUNTING BRASS & BRONZE CO. Norman L. Sattler is the new director of personnel and William H. Searles is manager of market research, a newly created department in the firm.

Sattler comes to Bunting from the W. W. Bliss Co. where he held a similar position since 1949. Searles was with Reynolds Metals Co. and prior to that with Owens-Illinois Glass Co.

Both men were chosen for their outstanding ability and unusual experience in their chosen fields.

U.S. AIR FORCE HONORS LOEWY OF B-L-H

Because he was instrumental in convincing the United States government of the importance of extrusion press installations, Erwin Loewy, received the Air Force Scroll of Appreciation. The scroll was presented by Major General John W. Sessums Jr., Vice Commander of the Air Research and Development Command. Extrusion presses were critical tools which were lacking in 1940. Through Loewy's efforts, 15 installations were ready for operation by December 7, 1941, when America began fighting in World War Two. Today Loewy is a director of the Baldwin Lima Hamilton Corp.

even on experimental work..

YOU SAVE WHEN YOU SPECIFY OPC CASTINGS

This intricate casting, a component of an aircraft valve assembly, is being produced for Koehler Aircraft Products Co., Inc. As a part of an experimental program, only a few of these castings have been turned out, yet they have already proved economical.

Exceptionally smooth finish, typical of all OPC castings, eliminates costly machining; absolute accuracy, expected of OPC castings, meets the close tolerances common to aircraft parts production.

Perhaps you can cut costs on your next small parts project — experimental or production. Our illustrated brochure shows what OPC has done for others . . . and could do for you.

OPC

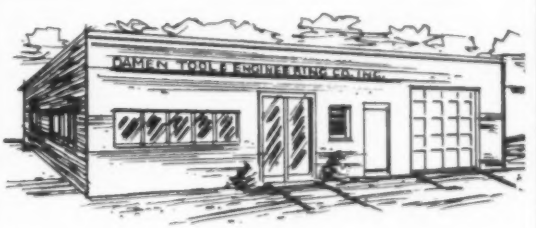
OHIO PRECISION CASTINGS, INC.

P. O. Box 55, Sta. A. . . . . DAYTON 3, OHIO

Plaster Mold Castings made from

BRASS • BRONZE • ALUMINUM • BERYLLIUM COPPER

For more information circle No. 68 on the Reader Service Card



PRECISION DIE MAKING

. . . for die casting is part of the service available from Damen. A 3-spindle Keller Duplicator, capable of three identical cavities at a time, is ready to go on your work. We can machine cavities up to 36" x 36".

Damen offers you complete engineering and tool room facilities to design and build die casting dies and plastic molds.

Send your designs or samples to us for prompt quotation.

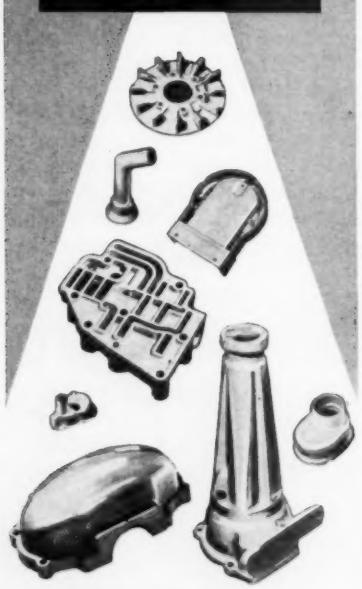
DAMEN TOOL & Engineering Co. Inc.

4621-27 N. OLCOTT AVE.
CHICAGO 31, ILLINOIS
Phone: UNderhill 7-8111

For more information circle No. 28 on the Reader Service Card

Paramount

YOUR BEST SOURCE



Flexibility

. . . a by-word with PARAMOUNT

Large castings, small castings, varied shapes and sizes . . . thin walls, combining strength and rigidity . . . close tolerances that eliminate machining — are every day routine at PARAMOUNT.

Our designers, sales engineers, plus modern tooling and production facilities are available for your complete die casting requirements.

WRITE FOR FREE DESCRIPTIVE BROCHURE

ALUMINUM ZINC MAGNESIUM

Paramount DIE CASTING COMPANY
ST. JOSEPH 22, MICHIGAN

Circle No. 82 on the Reader Service Card

PMM OPPORTUNITIES

jobs & equipment

Opportunities rates: $20 for the first column-inch; $15 for each additional column-inch payable in advance. To answer box number advertisements, address responses to the box at Precision Metal Molding. 812 Huron Rd., Cleveland 15, Ohio. Closing date: 1st day of month preceding publication.

EQUIPMENT

FOR SALE

1 — 150-ton Reed-Prentice	$3300
1 — 200-ton Reed-Prentice	$3300
4 — 400-ton Cast Master, aluminum	$6600 each
1 — 400-ton Cast Master, automatic aluminum	$8800
1 — 200-ton G & M, aluminum	$3300
1 — 200-ton G & M, zinc	$3300
1 — 9J Gorton duplicator with hydraulic True Tracer	

Address inquiries or call Mr. Arnold Williams, 4518 Lakeside Ave., Cleveland 14, Ohio Henderson 2-2626

WANTED—Used No. 500 B & T zinc machine. Larger or similar type would be satisfactory. Advise complete details and best price.

FOR SALE—6000 lb. zinc iron pot Stroman melting furnace.

Fort Recovery Industries, Inc. Fort Recovery, Ohio.

POSITIONS OPEN

Diecasting Salesman. Established, medium size company in New York offers salary and commission to active man or woman with experience in this industry. Replies held confidential. Box No. 9158.

ESTIMATOR — ENGINEER

Prepare cost estimates from blueprints and standard data for wide variety of Aluminum Sand Castings for bidding purposes.

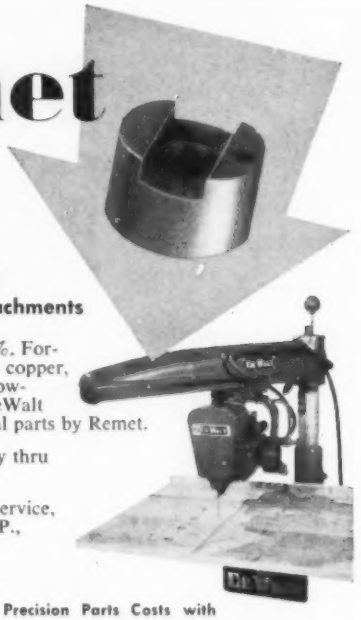
High degree of interest in mechanics with some experience in machine and/or tool design desired, since estimator also assists in design of pattern equipment for production.

A good position with a company established in 1875.

Write — Oberdorfer Foundries, Inc.
c/o Personnel Director
Syracuse, N. Y.

11 Remet POWDERED METAL PARTS

now go into DEWALT POWER SAW and attachments



- This Remet collar reduced part cost 80%. Formerly a precision casting in beryllium copper, it is now a Remet copper infiltrated powdered iron part. Advantages led to DeWalt specifying 11 different powdered metal parts by Remet.
- DeWalt now offers greater saw accuracy thru maintenance of closer tolerances.
- "You can depend on Remet for better service, fast delivery," states A. C. Wedge, V.P., Mfg., DeWalt Div., American Machine & Foundry Company.

FREE, NEW BROCHURE **"How to Cut Precision Parts Costs with the Remet Powdered Metal Process" gives complete information.**

Send for your copy today.

Remet
REESE METAL PRODUCTS CORPORATION
537 Howard Ave., Lancaster 10, Penna.

Gears • Pinions • Cams • Ratchets "Oilless" Bearings • Bushings • Machine and Structural Parts in COPPER • BRASS • IRON • ALLOY STEEL • NICKEL SILVER • COPPER INFILTRATED IRON

For more information circle No. 72 on the Reader Service Card

POSITIONS WANTED

EXPERIENCED DIE CASTING ENGINEER 25 years experience in all phases of the die casting field from design to finished production. Graduate Elec.-Mech. Engineer. Location immaterial. Box No. 9258.

LETTERS — *continued*

thought possibly you may know of other manufacturers who are now doing the same thing or something very similar. J.R.M., Jr.,—chief eng.

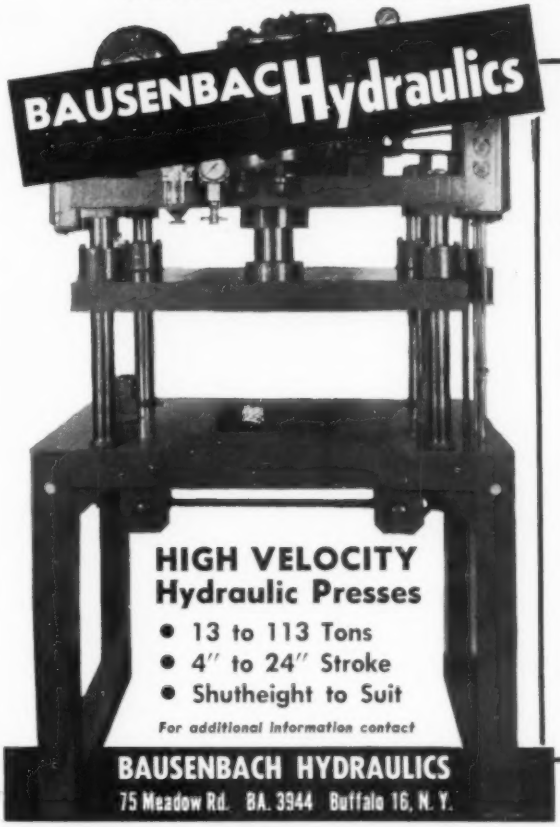
We do not know of any motor manufacturers who do this particular job. However, some of the die casting machine companies make special machines to do this particular type of job, as well as to make die cast rotors. Names of these machine companies have been sent to this reader.—Ed.

RUBBER MOLDS

We are attaching a leaflet from your June issue and would like to obtain the names of companies versed in the art of casting alloys in rubber molds. Please send this to the attention of the writer.—C.S., purchasing agent.

For more information circle No. 95 on the Reader Service Card

BAUSENBACH Hydraulics



HIGH VELOCITY
Hydraulic Presses
- 13 to 113 Tons
- 4″ to 24″ Stroke
- Shutheight to Suit

For additional information contact
BAUSENBACH HYDRAULICS
75 Meadow Rd. BA. 3944 Buffalo 16, N. Y.

Tried! Tested! PROVEN!
Revolutionary Fast Trimpress REQUIRES ONLY 3 HP
•
MINIMUM FLOOR SPACE
•
2 & 4 POST MODELS
•
Standard Sizes -20 Ton Models:
18″ x 24″
24″ x 24″
24″ x 30″
24″ x 36″
30″ x 36″

TAKES JUST 60 SECONDS TO TEST MOVING CHAIN CONVEYOR for OVERLOAD

WITH
DILLON
Dynamometer

Now you can take frequent, accurate checks on conveyor chains and put a stop to costly breakdowns! No need to halt, break or loosen conveyors to attach this DILLON DYNAMOMETER. Utilizing a quickly positioned tensioning assembly at any check point, you install the DILLON DYNAMOMETER in 45 to 60 seconds while conveyor is moving. Remove it just as quickly and easily!

This is just ONE of more than 100 different ways in which the versatile DILLON DYNAMOMETER can serve in *your* plant. Capacities from as low as 500 lbs. up to as high as 100,000 lbs. Why not write today for profusely illustrated catalog in full color?

W. C. DILLON and CO., Inc.
14598AB Keswick St.
VAN NUYS 41, CALIF.
(Suburb of Los Angeles)

For more information circle No. 30 on the Reader Service Card

QUALITY √ PRICE √ DESIGN √
CAPACITY √ DELIVERY DATE √

All things check
at CHARLES ZAPF & CO.

from the blue print to the finished die casting die. We are prepared to produce the best possible mold to meet your exacting requirements.

Our staff of experienced designers, engineers and mold makers, working with modern equipment, assures you of a job well done.

Our equipment includes the latest Keller and Hydrotel with capacity of molds up to four tons.

We are licensees of the Shaw Process for precision casting of cavities & cores in hot work tool steels.

Die Casting Dies

CHARLES ZAPF & CO.
2425 MAIN STREET EVANSTON, ILL.
Phone DAvis 8-0333

For more information circle No. 84 on the Reader Service Card

PMM INDEX OF ADVERTISERS: SEPTEMBER, 1958

A

ACF Industries, Inc. 86
Acheson Colloids Co. 15
Ajax Engineering Corp. 32
Allegheny-Ludlum Steel Corp. 6
Allied Research Products, Inc. 76
Almco Queen Products, Inc. 79
Aluminum & Magnesium, Inc. 12
Aluminum Smelting & Refining Co. ..... Cover II
American Die Casting Institute, Inc. 50
American Smelting & Refining Co. 27
American Zinc Sales Co. 89
Apex Smelting Co. ..... Cover IV
Atols Tool & Mold Corp. 9
Auto-Diesel Piston Ring Co. 94

B

B & T Machinery Co. 49
Badger Die Casting Corp. 91
Bausenbach Hydraulics 107
Bethlehem Steel Co. 38
British Industries Corp. 23
Buhler Brothers, Inc. 94

C

Carborundum Co., The 72, 73
Cast-Master, Inc. 28, 29
Cast-O-Matic Corp. 96
Casting Engineers, Inc. 83
Celanese Corp. of America 16, 17
Century Die Casting Co. 99
Certified Alloys Co. ..... Cover II
Cleveland Automatic Machine Co. 11
Consolidated Mining & Smelting Co. of Canada Ltd. 20
Crane Packing Co. 69
Crucible Manufacturers' Association 19

D

DCMT Sales Corp., Div. of British Industries 23
Damen Tool & Engineering Co., Inc. 105
Detroit Mold Engineering Co. 1
W. C. Dillon & Co., Inc. 107
Dixon Sintaloy Inc. 98
Dodge Steel Co. 22
Dollin Corp. 2

E

Eastern Casting Corp., Div., Eastern Malleable Iron Co., The 103
Engis Equipment Co. 24
Ettco Tool & Machine Co., Inc. 84

F

Federal Die Casting Co. 95
Federated Metals Division, American Smelting and Refining Co. 27
Fiske Brothers Refining Co. 69
Foundry Services, Inc. 90

G

General Smelting Co. 85
Gries Reproducer Corp. 97

H

Hall Aluminum Co. 99
Hammond Machinery Builders, Inc. 80
Hayes, C. I., Inc. 60
Henning Bros. & Smith, Inc. 100
Hoover Co., The ..... Cover III
E. F. Houghton & Co. 8
Hydraulic Press Mfg. Co. 25

I

Indussa Corporation 103
International Minerals & Metals Corp. 108
International Nickel Co. 26

J

A. Johnson & Co. 30
Johnson Machine & Press Corp. 101

K

Kux Machine Co. 62

L

Latrobe Die Casting Co. 61
Lester-Phoenix, Inc. 7
Leyden Hydraulics, Inc. 77
Litemetal Dicast, Inc. 37

M

Madison-Kipp Corp. 33
Marvel Engineering Co. 59
Milwaukee Die Casting Co. 77
Monarch Aluminum Mfg. Co. 93

N

National-U.S. Radiator Corp. Plastic Metals Div. 104
Neilson Chemical Co. 86
New England Die Casting Co. 40
New Jersey Zinc Co., The 18, 85
Northwest Chemical Co. 70

O

Oakite Products, Inc. 78
Ohio Precision Castings Inc. 105

P

Paramount Die Casting Co. 106
Pierce-Waller Co. 104

R

Reed-Prentice Corp. 5
Reese Metal Products Corp. 106
Republic Steel Corp. 34, 35
Richards Tool & Mold Co. 95
Roto-Finish, Inc. 81

S

St. Joseph Lead Co. 39
Richard O. Schulz Co. 87
Shell Oil Co. 31
Spincraft, Inc. 96
Stokes Corp., F. J. 36
Stroh Die Casting Co., Inc. 104
Stroman Furnace & Engineering Co. 84

T

Twin City Die Castings Co. 14

U

United-Carr Fastener Corp. 66
Union Carbide Chemicals Co., Division of U.C.C. 13
Universal-Cyclops Steel Corp. 21

W

Westinghouse Electric Corp. 58

Z

Charles Zapf & Co. 107

HUDSON BAY

SPECIAL HIGH GRADE ZINC — 99.99%

International Minerals and Metals Corp.

11 Broadway New York 4, N.Y.

One Fine Zinc For Die Casting

For more information circle No. 49 on the Reader Service Card

If it's experience you're after...

call a Hoover Man

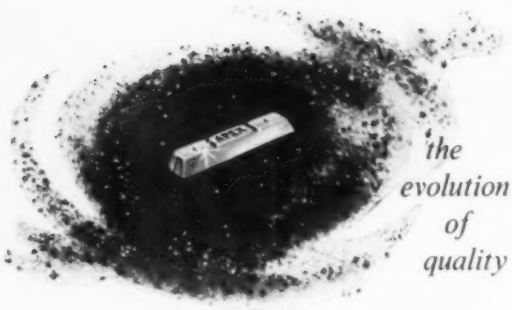
Some folks with experience and that certain touch can do the impossible. We aren't making any wild claims about the aluminum and zinc alloy castings we produce. But we've been satisfying our customers—many of them for 35 years. We make quality castings. Make 'em for lots of different companies. Why not call us? We'll have one of our experienced Sales Engineers give you the whole Hoover story.

THE HOOVER COMPANY, Die Casting Division, North Canton, Ohio
In Canada – Hamilton, Ontario

Die Casting specialists since 1922

DIE CASTING *by* HOOVER

For more information circle No. 44 on the Reader Service Card



the evolution of quality

HOW ALUMINUM CONTRIBUTES TO THE BEST CARS EVER BUILT

The superb automobile you drive today is an unprecedented package of power and beauty, comfort and performance. And more and more you find it relying on aluminum.

Every car now made in the United States has aluminum in its makeup, often in new applications that foretell the shape of aluminum things to come. In just three years automotive use of this versatile metal has increased an amazing 250 per cent. This year's cars are employing 29 per cent more than did the 1957 models. And there's much, much more ahead as the industry steps up its development of lighter automobile weight, better balance, greater maneuverability, higher gas mileage, resistance to rust and corrosion—through aluminum.

Apex is a significant name in this dynamic automotive market. Apex aluminum alloys are in every U.S. car for '58, filling a substantial share of today's automotive demand. Tomorrow they'll contribute in even greater volume as established Apex leadership in research and production provides the basic stuff of automotive advancement.

When you ride in the best cars ever built, you ride with Apex aluminum alloys—more and more.

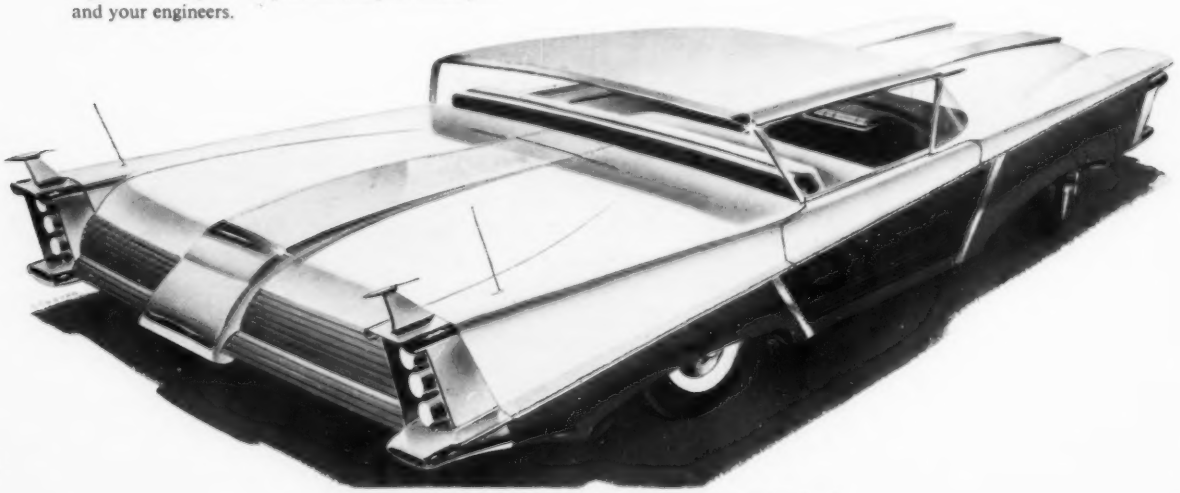
APEX SMELTING COMPANY

Producers of ALUMINUM, MAGNESIUM AND ZINC ALLOYS

CHICAGO 12 CLEVELAND 5 LONG BEACH 10, CAL.
SPRINGFIELD, OREGON (National Metallurgical Corp.)

Research leadership back of every ingot

Your products may also be produced better and more efficiently with the help of aluminum castings. Apex Smelting and the companies it serves in the die casting and foundry industry stand ready to assist you and your engineers.



For more information circle No. 8 on the Reader Service Card